TIMBER MANAGEMENT PLAN

BOISE NATIONAL FOREST WORKING CIRCLE

BOISE NATIONAL FOREST

Region 4

1956

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TIMBER MANAGEMENT PLAN

BOISE NATIONAL FOREST WORKING CIRCLE

BOISE NATIONAL FOREST

R-4, IDAHO

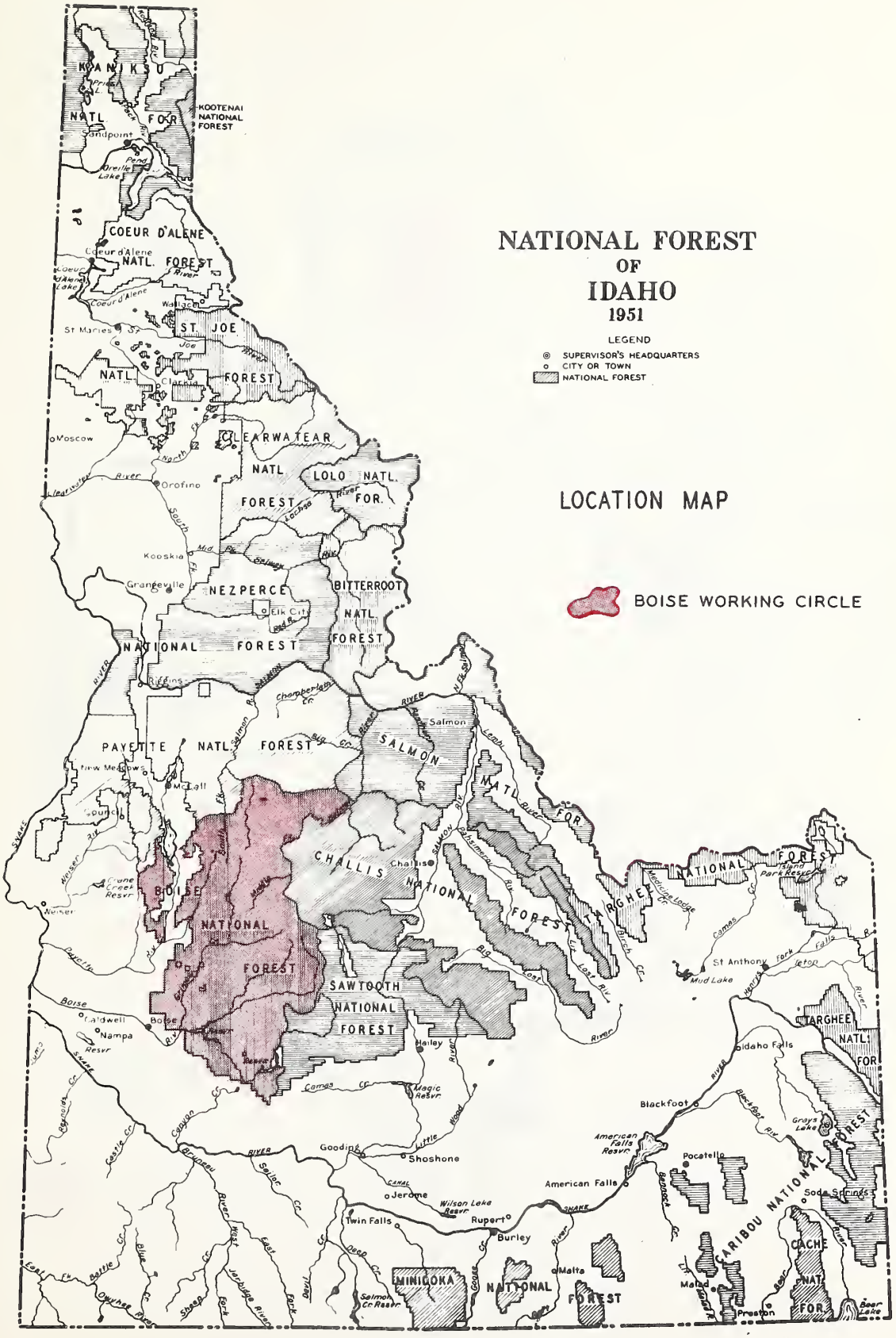
Prepared by Forester C. R. Melvin with assistance from Foresters Wendell Moran and Edward Noble in collaboration with Paul Grossenbach of the Regional Office.

APPROVED:	R.O.	W.O.
Timber Management	/s/ Lester Moncrief	/s/ Ira J. Mason
Range Management	/s/ Floyd Iverson	/s/ C. A. Joy by W. D.Hurst
Lands	/s/ A. G. Nord	/s/ John Sieker
Watershed Management	/s/ A. G. Nord	/s/ Walter L. Schipull
Wildlife Management	/s/ D. I. Rasmussen	/s/ Lloyd W. Swift
Recreation	/s/ A. G. Nord	/s/ John Sieker
Fire Control	/s/ Boyd Rasmussen	/s/ Merle S. Lowden
Engineering	/s/ Sam K. Greenwood	/s/ C. T. Sullivan
Pest Control		/s/ W. V. Benedict

APPROVED:

/s/ K. D. Flock Forest Supervisor	7/26/56 Date
/s/ C. J. Olsen Regional Forester	7/31/56 Date
/s/ Edward P. Cliff Acting Chief, Forest Service	12/14/56 Date

I N D E X



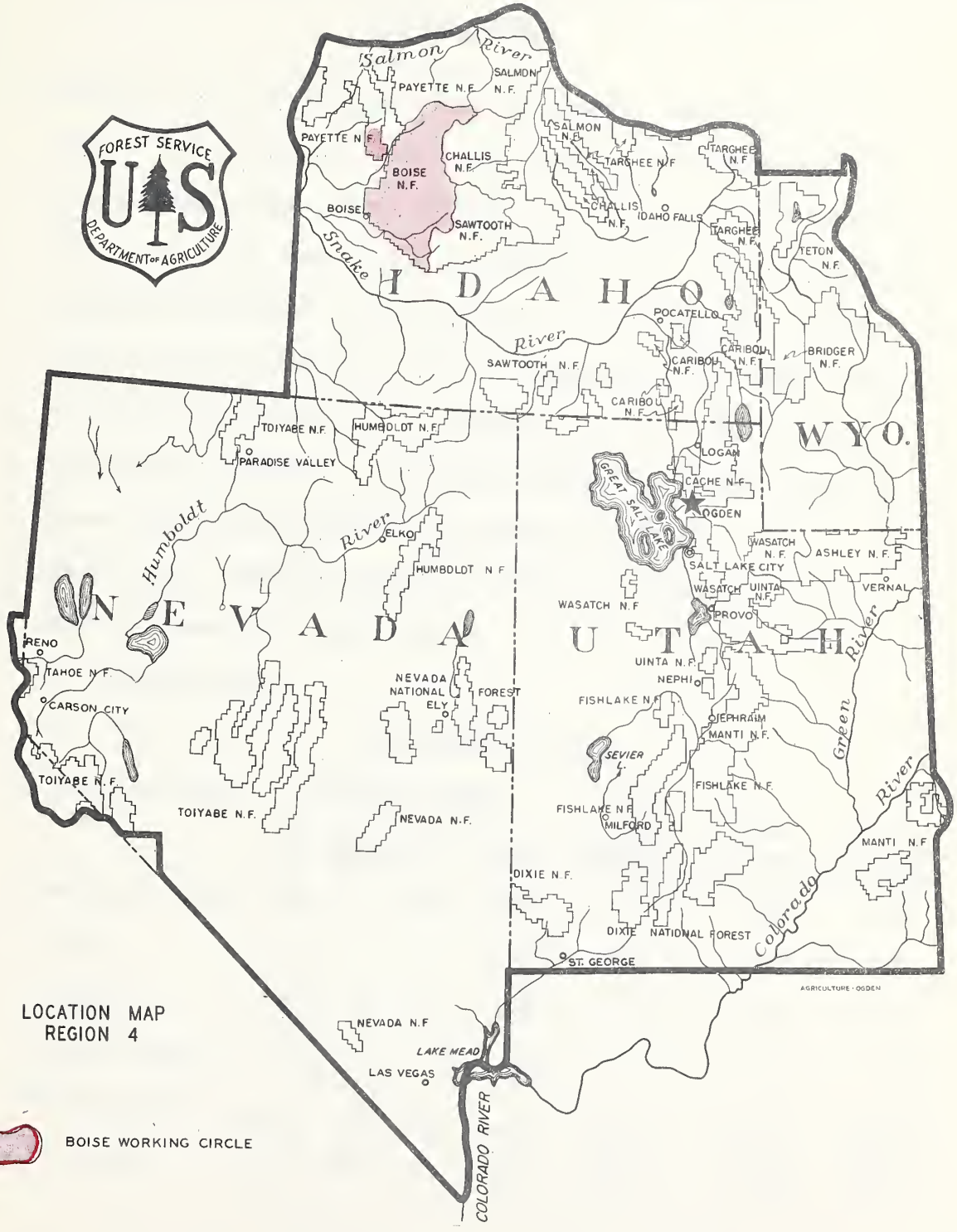
NATIONAL FOREST OF IDAHO
1951

LEGEND

- ◎ SUPERVISOR'S HEADQUARTERS
- ○ CITY OR TOWN
- NATIONAL FOREST

LOCATION MAP

BOISE WORKING CIRCLE


FOREST SERVICE
U S
DEPARTMENT OF AGRICULTURE
Salmon River
SALMON N.F.
PAYETTE N.F.
BOISE N.F.
CHALLIS N.F.
TARGHEE N.F.
IDAHO FALLS
SAWTOOTH N.F.
Snake River
I D A H O
POCATELLO
CARIBOU N.F.
BRIDGER N.F.
TETON N.F.
WYO.
TOIYABE N.F.
HUMBOLDT N.F.
PARADISE VALLEY
LOGAN
CACHE N.F.
GREAT SALT LAKE
OGDEN
Humboldt River
ELKO
WASATCH N.F.
ASHLEY N.F.
SALT LAKE CITY
UINTA N.F.
VERNAL
PROVO
N E V A D A
U T A H
RENO
TAHOE N.F.
CARSON CITY
NEVADA NATIONAL FOREST
ELY
NEPHI
FISHLAKE N.F.
MANTI N.F.
SEVIER R.
Green River
Colorado River
TOIYABE N.F.
NEVADA N.F.
MILFORD
DIXIE N.F.
DIXIE NATIONAL FOREST
ST. GEORGE
AGRICULTURE - OGDEN
LOCATION MAP
REGION 4
NEVADA N.F.
LAKE MEAD
LAS VEGAS
COLORADO RIVER
BOISE WORKING CIRCLE

INTRODUCTORY SUMMARY

FOREST MANAGEMENT PLAN FOR THE BOISE NATIONAL FOREST

WORKING CIRCLE

1. Location - All of the Boise National Forest. Area lies within Ada, Boise, Elmore, Gem and Valley Counties in southwest Idaho.

2. Communities - Those primarily dependent are Emmett (3067 population), Horseshoe Bend (401), and Cascade (943). Those secondarily dependent are Boise (34,393 population), Mountain Home (1887), Idaho City (246), Meridian (1810), Caldwell (2480), Nampa (7000), Garden Valley-Crouch (410). In addition, several smaller communities are dependent on an active logging and milling industry. These include Ola, Placerville, Atlanta, Lowman.

3. Industries - Lumbering, mining, farming, and stock raising.

4. Area of Commercial Forest Land -

   a. Loggable Lands

(Thousands of Acres)

Ownership Class	Sawtimber Types				Poles and Saplings	Deforested	Total Commer.
	PP	Mixed	LP	Total			
National Forest	528	503	62	1093	167	93	1353
State	53	18	1	72	11	14	97
Private	133	39	2	174	37	30	241
Other Federal	10	2	-	12	1	5	18
Other Outside	3	3	-	6	2	2	10
Total	727	565	65	1357	218	144	1719

b. Non-loggable Lands

(Thousands of Acres)

Ownership Class	Sawtimber Types PP	Mixed	LP	Total	Poles and Saplings	De-forested	Total Commer.
National Forest	33	233	7	273	39	32	344
State	1	1	-	2	-	-	2
Private	-	2	-	2	-	-	2
Other Federal	-	-	-	-	-	-	-
Total	34	236	7	277	39	32	348

5. Total Net Timber Volume in Commercial Forest Land

a. Loggable Land

MM Board Feet

Ownership Class	Species PP	Mixed	LP	Total
National Forest	4,904	6,470	405	11,779
State	284	274	10	568
Private	640	572	31	1,243
Other Federal	82	53	-	135
Other Outside	18	24	-	42
Total	5,928	7,393	446	13,767

b. Non-loggable Land

MM Board Feet

Ownership Class	Species PP	Mixed	LP	Total
National Forest	337	1,705	93	2,135
State	4	13	-	17
Private	-	2	-	2
Other Federal	-	-	-	-
Total	341	1,720	93	2,154

6. Allowable Annual Cut

a. Regulated volume which may be cut annually.

	PP	Mixed	Total
National Forest Land	61.1	68.8	129.9

b. Area planned to be cut annually.

	PP Type	Mixed Type	Total
National Forest Land	20,559	11,972	32,531

7. Date of Revision - January 1966 or before if necessary.

FIVE-YEAR CUTTING BUDGET - BOISE NATIONAL FOREST WORKING CIRCLE

Block	1956 Area	PP	Mixed	Total	1957 Area	PP	Mixed	Total	1958 Area	PP	Mixed	Total	1959 Area	PP	Mixed	Total	1960 Area	PP	Mixed	Total
Mountain Home D-1	Cow Creek	4.4	1.6	6.0	Cow Creek	1.6	.6	2.2	Bear Cr. #2	1.0	.7	1.7	Steel Mtn.	1.2	1.0	2.2	Clark Gulch	1.2	.3	1.5
	Bear Creek	.5	.5	1.0	Bear Creek #1	1.1	1.4	2.5	Wide West	1.0	.2	1.2	Clark Gulch	1.4	.4	1.8	Byron Creek	1.8	.2	2.0
					Bear Creek #2	.7	.7	1.4	Steel Mtn.	2.0	1.7	3.7	Byron Creek	2.0	.3	2.3	Trinity Creek	2.5	1.0	3.5
					Wide West	1.5	.5	2.0	So.Fk.Bear Cr.	.5	.7	1.2								
	Total	4.9	2.1	7.0		4.9	3.2	8.1		4.5	3.3	7.8		4.6	1.7	6.3		5.5	1.5	7.0
Cottonwood D-2	Smith Creek #2	4.5	.5	5.0	E. Fork Smith	3.0	.5	3.5	Mule Gulch	3.0	1.0	4.0	French Creek	6.0	1.0	7.0	French Creek	6.0	1.0	7.0
	E.Fk.Smith Cr.	3.0	.5	3.5	Mule Gulch	3.0	1.0	4.0	So.Fk.Sheep Cr.	2.0	1.0	3.0	Small area	1.5	.5	1.0	Small area	.5	.5	1.0
	Krasi Mt.,Grape Mt.	1.2	.2	1.2	Roaring River	1.0	.5	1.5	Small area	.5	.5	1.0								
	Total	8.5	1.2	9.7		7.0	2.0	9.0		5.5	2.5	8.0		6.5	1.5	8.0		6.5	1.5	8.0
Idaho City D-3	German Creek	1.9	.4	2.3	Meadow Creek	1.2	.8	2.0	German Creek	2.5	1.0	3.5	Fourth Creek	3.7	1.3	5.0	Third Creek	4.0	1.5	5.5
	Kerney Creek	2.2	.3	2.5	Rough Creek	.4	.2	.6	Small area	1.0	1.5	2.5	Fringe areas	.5	1.5	2.0	Fringe areas	.5	1.5	2.0
	Daggett Creek	2.1	.5	2.6	Clear Creek	.3	.3	.6												
	Clear Creek		.3	.3	German Creek	2.0	.5	2.5												
	Boise Ridge	.3	.3	.6	Small area	1.0	1.0	2.0												
	Total	6.5	1.8	8.3		4.9	2.8	7.7		3.5	2.5	6.0		4.2	2.8	7.0		4.5	3.0	7.5
Atlanta D-4	Phifer Creek	.5	.5	1.0	Fall Creek		2.5	2.5	Fall Creek		2.0	2.0	Robert E. Lee	8.0	2.0	10.0	Lost Man Cr.	5.4	5.8	11.2
	Swanholm	.5	1.0	1.5	Lower Trail Cr.	3.0	.5	3.5	Robert E. Lee	4.0	1.5	5.5	Lost Man Cr.	.5	.7	1.2				
	Trail Creek	4.0	2.0	6.0	Eagle Creek		1.0	1.0	Eagle Creek		2.0	2.0								
	Fall Creek		2.5	2.5	Bear Creek		1.5	1.5	Bear Creek		1.5	1.5								
	Total	5.0	6.0	11.0		3.0	5.5	8.5		4.0	7.0	11.0		8.5	2.7	11.2		5.4	5.8	11.2
Lowman D-5	Big Owl	5.0	2.5	7.5	Big Owl	5.0	2.5	7.5	Big Owl Creek	5.0	2.5	7.5	Big Owl	5.0	2.5	7.5	Big Owl	5.0	2.5	7.5
	Gotch Creek	.5	2.4	2.9	Little Beaver	2.0	1.3	3.3	Clear Creek		2.5	2.5	Clear Creek		2.5	2.5	Clear Creek		2.5	2.5
	Banner Creek	.2	2.4	2.6	Chapman & Mac D	3.0	1.0	4.0	Little Beaver	4.0	2.0	6.0	Little Beaver	2.0	2.0	4.0	Pikes Fork	6.0	2.0	8.0
	Little Beaver	3.0	1.6	3.6	Crooked River	.5	2.5	3.0	McDonald	2.3	.7	3.0	Ten Mile	2.3	.7	3.0	Ten Mile	2.6	.9	3.5
	Canyon Creek	2.7	2.0	4.7	Lower Banner	3.0	.8	3.8	Beaver Creek	.5	.5	1.0	Crooked River	.5	.5	1.0	Crooked River	.5	.5	1.0
	Crooked River	1.0	1.0	2.0	Clear Creek		1.5	1.5					Summitt Creek		2.0	2.0	Summitt Creek	.5	2.5	3.0
	Total	14.4	11.9	26.3		13.5	9.6	23.1		11.8	8.2	20.0		9.8	10.2	20.0		14.6	10.9	25.5
Emmett D-6	Dry Buck	.5	.5	1.0	Sams Meadow	1.5	2.0	3.5	Sams Meadow	1.5	1.0	2.5	Phillips Creek	1.0	1.5	2.5	Squaw Creek	3.5	1.5	5.0
	Bogus Creek	.2	.7	.9	Sagehen	2.0	2.0	4.0	Sagehen	2.0	2.0	4.0	Tripod Creek	.5	1.0	1.5	Second Fork	1.0	1.0	2.0
	Savy Mill	1.3	.7	2.0	Savy Mill	1.0	.5	1.5	Phillips Cr.	1.5	1.0	2.5	Squaw Creek	1.5	1.0	2.5	Williams Cr.	.5	1.5	2.0
	Sagehen	2.0	3.0	5.0					Tripod Creek	.5	1.0	1.5	Second Fork	1.0	1.0	2.0	Soldier Creek	1.0	1.0	2.0
	Muir Creek	.5	.5	1.0									S.Fk. L. Squaw	1.5	1.0	2.5				
	Second Fork	.5	1.5	2.0																
	Total	5.0	6.9	11.9		4.5	4.5	9.0		5.5	5.0	10.5		5.5	5.5	11.0		6.0	5.0	11.0
Garden Valley D-7	Six Mile	7.0	8.0	15.0	Smith Creek	2.0	1.0	3.0	Bridge Creek	6.5	7.0	13.5	Six Mile	7.0	8.0	15.0	West Fork	6.0	6.0	12.0
	Anderson Creek	3.0	2.0	5.0	Six Mile	10.0	10.0	20.0	Six Mile	5.0	5.0	10.0	Scriver Creek	1.0	4.0	5.0	Danskin	.6	.5	1.1
	Scriver Creek	2.0	10.0	12.0	Bridge Creek	3.0	3.0	6.0	Scriver Creek	1.0	1.0	2.0	West Fork	2.0	2.5	4.5	Scriver Creek	.2	3.8	4.0
	Little Camp	.5	1.0	1.5					West Fork	2.0	2.5	4.5	Big Pine	1.0	.8	1.8				
	Gooseberry	2.0	.8	2.8																
	Total	14.5	21.8	36.3		15.0	14.0	29.0		14.5	15.5	30.0		11.0	15.3	26.3		6.8	10.3	17.1
Bear Valley D-8	Wilson Creek	.5	.7	1.2	Deadwood	.5	1.5	2.0	W.Side Deadwood	2.0	3.0	5.0	Upper Deadwood	3.0	3.0	6.0	Upper Deadwood	4.0	4.0	8.0
									Bear Valley		4.0	4.0	Bear Valley		5.0	5.0	Bear Valley		5.0	5.0
	Total	.5	.7	1.2		.5	1.5	2.0		2.0	7.0	9.0		3.0	8.0	11.0		4.0	9.0	13.0
Cascade D-9	Two Bit Creek	1.5	1.5	3.0	Dollar Creek	3.0	5.0	8.0	Dollar Creek	1.3	5.0	6.3	Stolle Mdw.	4.0	4.0	8.0	Stolle Mdw.	1.5	1.5	3.0
	Six Bit Creek	3.0	2.0	5.0	Trail Creek	1.0	2.0	3.0	Trail Creek	1.0	4.0	5.0	Clear Creek	2.4	1.3	3.7	Clear Cr.	2.4	1.3	3.7
	Dollar Creek	3.0	3.0	6.0	Small sales	.5	.5	1.0	Stolle Mdw.	1.5	1.5	3.0					Scott Valley	2.0	2.0	4.0
	Total	7.5	6.5	14.0		4.5	7.5	12.0		3.8	10.5	14.3		6.4	5.3	11.7		5.9	4.8	10.7
Landmark D-10	Johnson Creek		1.5	1.5	Sand Creek		3.0	3.0	Burnt Log		3.0	3.0	E.Fk.Burnt Log		4.0	4.0	E.Fk.Burnt Log		4.0	4.0
	Sand Creek		6.0	6.0	Burnt Log		5.0	5.0	E.Fk.Burnt Log		4.0	4.0	Sheep Creek		4.0	4.0	Sheep Creek		3.5	3.5
	Yellow Pine	.4	.6	1.0	Yellow Pine	.4	.6	1.0	Yellow Pine	.4	.6	1.0	Dutch Creek	1.2	1.5	2.7	Dutch Creek	1.2	1.3	2.5
	Total	.4	8.1	8.5		.4	8.6	9.0		.4	7.6	8.0		1.2	9.5	10.7		1.2	8.8	10.0
	GRAND TOTAL	67.2	67.0	134.2		58.2	59.2	117.4		55.5	69.1	124.6		60.7	62.5	123.2		60.4	60.6	121.0

MANAGEMENT PLAN

FOR THE

BOISE NATIONAL FOREST WORKING CIRCLE

1. Summary of results under previous plans.

In years past the Boise National Forest was divided into nine working circles, the allowable cut for each varying from 240 MBM to 7,280 MBM. Various plans have been made since 1929 for these areas with only two of them reaching the stage of Chief's office tentative approval.

A management plan summary was prepared in 1947 showing the allowable annual cut for these nine working circles. The total allowable cut for the forest as determined at that time was 21.5 million board feet. In 1950 another summary was prepared and the estimated annual cut was established at 34.1 million board feet. Early in the year 1952 a policy statement was prepared for the forest and at this time the annual cut was calculated to be 38 million board feet.

A survey of the timber resources for the entire forest was initiated in 1951 and completed in 1953. This was the first time that the entire forest was considered as a whole for a working circle. Also, this was the first time an entire volume estimate was available on a planwise basis. Previously timber surveys had been piecemeal with estimates for areas not actually covered by any timber survey.

During the early part of 1953 rough figures were available for the forest. It was evident that the total volume and allowable annual

cut greatly exceeded all previous estimates. A new brief policy statement was then made resulting in an estimated 131 million board feet allowable annual cut.

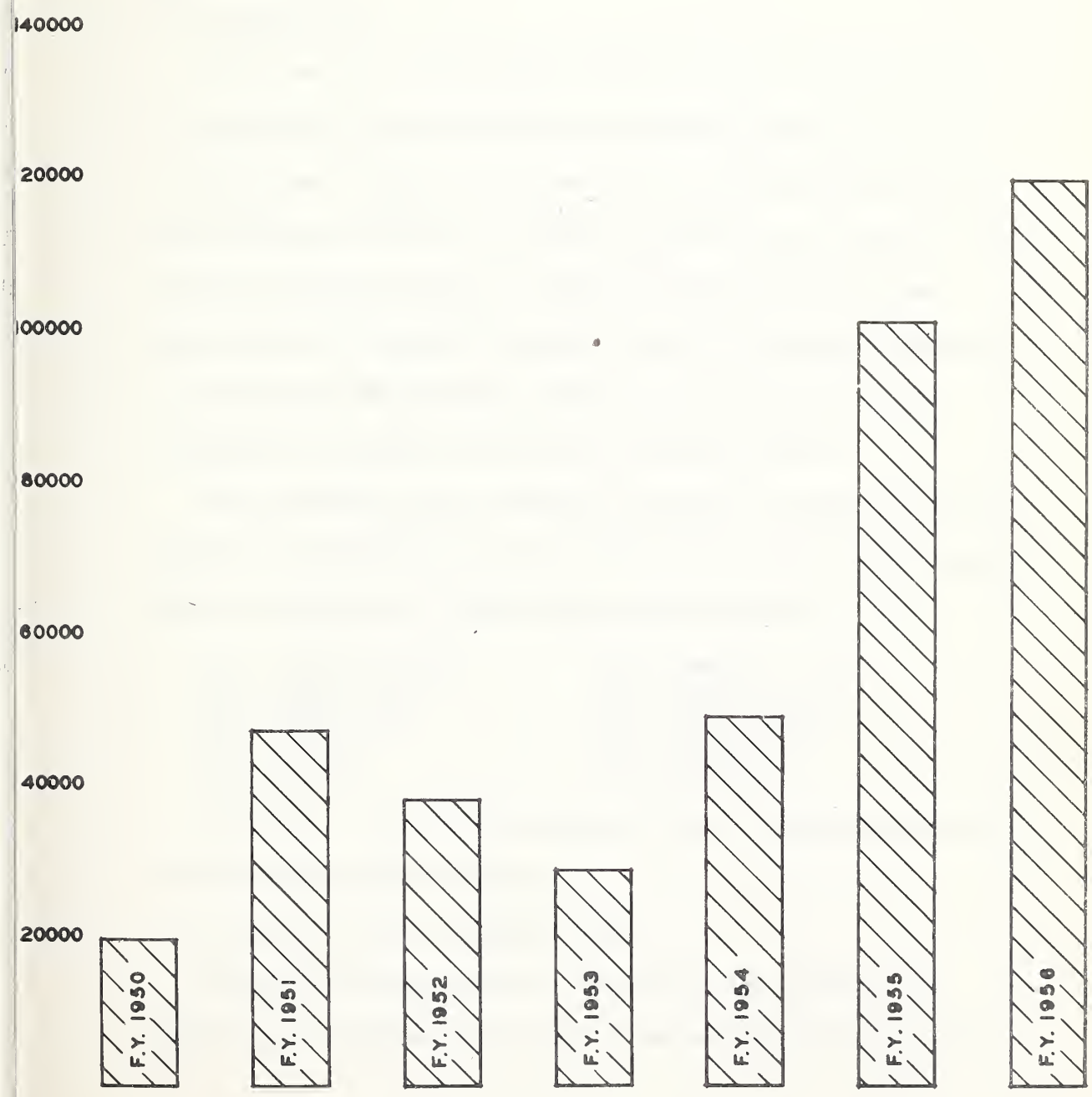
Results generally were satisfactory under the various above-mentioned plans. In most cases suggested harvesting priorities and budgets were followed. For a period since 1933 the actual cut on the forest has been 30 million board feet, which indicates the goals set up by the various policy statements were being met.

Since 1953 the forest has been in the process of building this cut up to that shown in the policy statement of that year with the following results:

Fiscal Year	Cut
1953	29 MM bd. ft.
1954	49 MM bd. ft.
1955	102 MM bd. ft.
1956	120 MM bd. ft. (est.)

In 1957 the allowable cut as shown in this plan should be achieved.

TIMBER CUT
BOISE WORKING CIRCLE
F.Y. 1950 THROUGH F.Y. 1956



2. Land Description.

a. Boundaries

The working circle will be the Boise National Forest and the working circle boundaries will coincide with the forest's boundaries.

b. Subdivisions

There are two subdivisions in the working circle that will be considered inoperative from the timber management standpoint in this plan. They are that portion of the Sawtooth Wilderness Area and that portion of the Idaho Wilderness Area that are within the Boise National Forest. These areas hold primitive area status and are considered inactive insofar as timber management is concerned. They should, however, be considered from the standpoint of disease, insect, and fire protection.

The remainder of the working circle has been subdivided into blocks, the boundaries of which will coincide with present ranger district boundaries. These blocks are as follows:

D-1	Mountain Home	D-6	Emmett
D-2	Cottonwood	D-7	Garden Valley
D-3	Idaho City	D-8	Bear Valley
D-4	Atlanta	D-9	Cascade
D-5	Lowman	D-10	Landmark

Map number 3 shows the location of each of these blocks within the working circle boundary.

c. Relation to Other Working Circles

The Boise Working Circle is bounded on the north by the Payette N. F. Working Circle and on the southeast by the South

Boise Working Circle on the Sawtooth N. F. which are active areas. It is further bounded on the east by inoperative blocks of the Sawtooth and Challis National Forest Working Circles.

The relationship of the Boise Working Circle to the two active ones is of utmost importance. Some operators are now working simultaneously on more than one of these circles and communities affected are not only dependent upon the Boise Working Circle, but must rely partly on all three. Modern methods of logging and transportation could result in more operators expanding to these adjacent areas.

It is very evident that timber sale procedures, management practices, road standards, and utilization standards be very closely correlated on these three working circles.

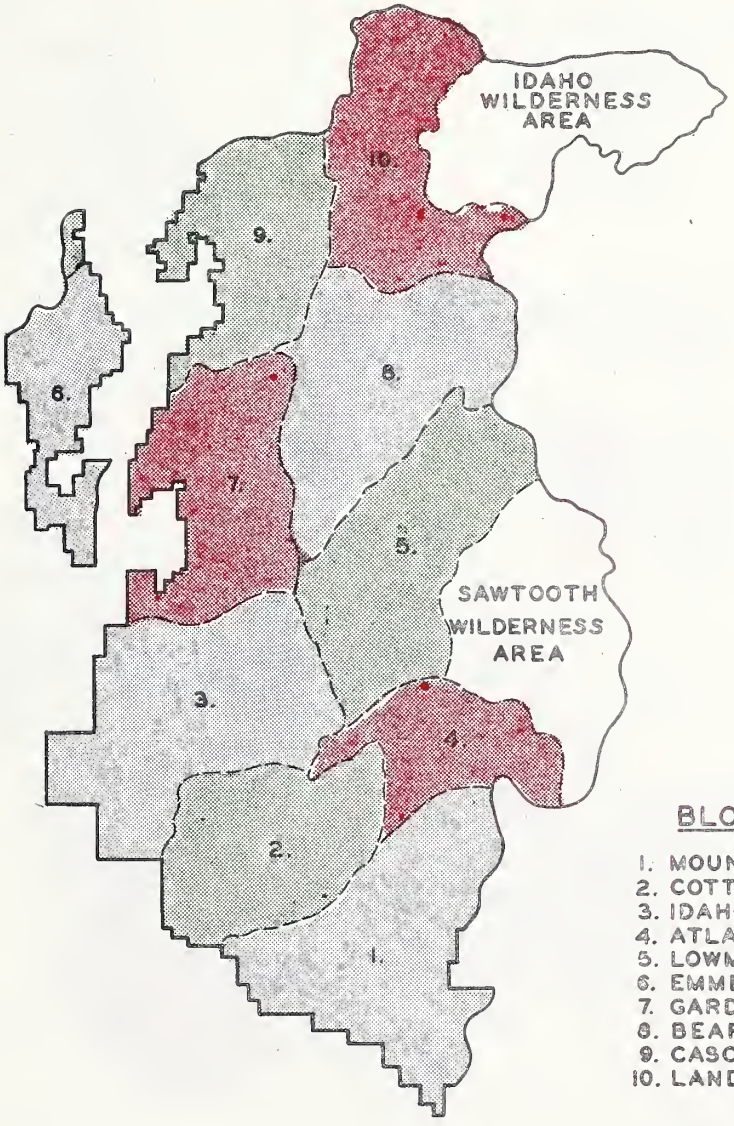
At the present time the bulk of the national forest stumpage from the Boise Working Circle goes into Boise, Emmett, Mountain Home, Caldwell, Meridian, Cascade, Horseshoe Bend, and Crouch.

The supply of state and privately-owned timber on the Boise National Forest has greatly diminished and the communities are becoming more dependent on national forest timber each year. Competition for national forest stumpage has increased markedly the past few years. As this competition for stumpage increases the result may well be shifting of operations to other working circles and vice versa. Such shifting will necessitate a high degree of coordination of management with adjoining working circles.

Map number 4 shows the location of this working circle in relation to those adjacent.

BOISE NATIONAL FOREST WORKING CIRCLE

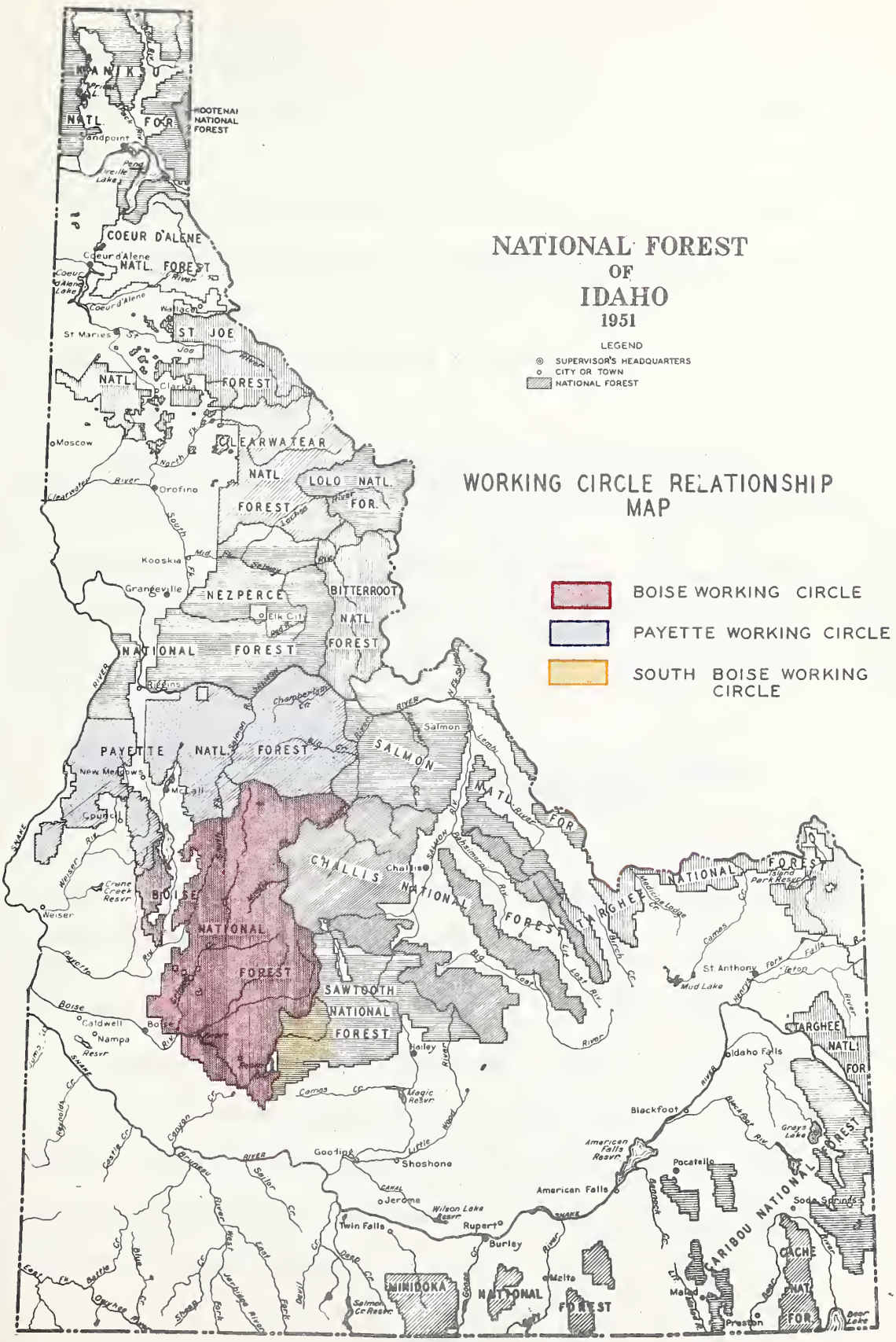
BOISE NATIONAL FOREST



BLOCKS

1. MOUNTAIN HOME
2. COTTONWOOD
3. IDAHO CITY
4. ATLANTA
5. LOWMAN
6. EMMETT
7. GARDEN VALLEY
8. BEAR VALLEY
9. CASCADE
10. LANDMARK

——— BOUNDARY BOISE NATIONAL FOREST WORKING CIRCLE.



NATIONAL FOREST OF IDAHO
1951

LEGEND

- ◎ SUPERVISOR'S HEADQUARTERS
- ○ CITY OR TOWN
- NATIONAL FOREST

WORKING CIRCLE RELATIONSHIP MAP

- BOISE WORKING CIRCLE
- PAYETTE WORKING CIRCLE
- SOUTH BOISE WORKING CIRCLE

3. Forest Description

The following data cover the active portion of the working circle.

Data concerning the Sawtooth Wilderness Area and the Idaho Wilderness Area blocks are not pertinent to the plan and will therefore be omitted here. Generalized data, however, for these "no cut" blocks will be found in Section E of the Appendix.

a. Land Ownership

Table I.--Commercial Forest Land by Ownership Classes
Loggable Areas Only On or Adjacent to the Boise N. F. Working Circle

Ownership	Large Sawtimber	Small Sawtimber	Poles & Saplings	Cut-Over	De-forested	Grand Total
National Forest	637,896	312,200	166,264	143,376	92,450	1,352,186
State	14,359	6,718	8,757	32,770	9,927	72,531
Private	20,809	10,223	32,755	118,821	24,419	207,027
Other Federal	8,310	930	1,275	3,221	5,150	18,866

Table II.--Ownership by All Classes of Land Adjacent
To The Boise N. F. Working Circle

Ownership	Total Loggable Commercial	Total Non-Loggable Commercial*	Non-Commercial	Non-Forest	Grand Total
National Forest	1,352,186	343,257	202,484	362,867	2,260,794
State	72,531	2,221	3,276	41,897	119,925
Private	207,027	266	1,671	151,297	360,261
Other Federal	18,886	-	464	50,724	70,074

*Non-loggable commercial forest land consists of land that supports timber of commercial quality, but which has been classed as non-loggable because of steep slopes, large amounts of rock outcrop, land supporting submarginal volumes and other factors which prohibit logging under present methods.

b. Timber Volumes

Table III.-- Total National Forest Land
Type Area and Volume Summary
Boise Working Circle

	Acres	Net Volume - Sawtimber Million Board Feet PP	DF	WF	ES	AF	LP	Total	Volume LP Poles M cu. ft.
PP large sawtimber	399,605	3,845	1,453	152	18	25	18	5,511	11,588
PP small sawtimber	11,568	66	24	-	-	-	-	90	787
PP cutover	117,380	682	274	7	-	2	7	972	-
PP poles & Saplings	13,281	12	5	-	-	-	-	17	-
Total PP	541,834	4,605	1,756	159	18	27	25	6,590	12,375
DF large sawtimber	206,854	172	1,977	20	86	148	39	2,442	8,888
DF small sawtimber	156,429	64	951	24	47	71	29	1,186	17,520
DF cutover	17,255	17	97	-	-	2	-	116	-
DF poles & saplings	45,329	-	20	-	-	1	1	22	-
Total DF	425,867	253	3,045	44	133	222	69	3,766	26,408
Spruce lg. sawtim.	21,726	-	11	-	178	27	33	249	-
" small sawtimber	23,792	-	3	-	177	53	24	257	3,997
" cutover	491	-	-	-	4	-	2	6	-
" poles & saplings	60	-	-	-	-	-	-	-	-
Total Spruce	46,069	-	14	-	359	80	59	512	3,997
AF large sawtimber	5,051	-	3	-	20	32	3	58	343
AF small sawtimber	58,550	-	50	3	18	173	45	289	3,747
AF cutover	260	-	-	-	-	1	-	1	-
AF poles & saplings	5,539	-	1	-	1	6	1	9	831
Total AF	69,400	-	54	3	39	212	49	357	4,921
WF large sawtimber	4,660	36	22	75	-	-	-	133	-
WF small sawtimber	1,799	2	13	23	-	2	-	40	-
WF cutover	6,387	4	15	45	-	-	2	66	-
WF poles & saplings	382	-	-	-	-	-	-	-	-
Total WF	13,228	42	50	143	-	2	2	239	-
LP small sawtimber	60,062	1	12	3	21	18	134	189	19,040
LP cutover	1,603	-	-	-	-	-	6	6	608
LP poles & saplings	101,673	3	31	-	14	11	61	120	47,786
Total LP	163,338	4	43	3	35	29	201	315	67,434
Subtotal	1,259,736	4,904	4,962	352	584	572	405	11,779	115,135
Deforested	92,450								
TOTAL COMMERCIAL	1,352,186	4,904	4,962	352	584	572	405	11,779	115,135

Table IV.--Sawtimber Volume of Other Ownerships
Loggable Volume Only

Ownership Class	Sawtimber Types* - MM Bd. Ft. - Net Volume PP	Mixed	LP	Total
State	377	187	2	566
Private	864	333	15	1,212
Other Federal	108	19		127

*Includes cut-over types.

c. Type Description

Timber types and classifications are those employed on the Southwest Idaho Timber Management Study and are given in detail on each type map resulting from the above study. (A representative type map is included in Section E. of this plan.)

Type name (species) was obtained by using the species which had the majority of volume in the type. Actual type descriptions correspond to those generally in use in Region 4, except for the change from breakdown into age groups to a breakdown of types into size groups which, essentially, are broad age classes.

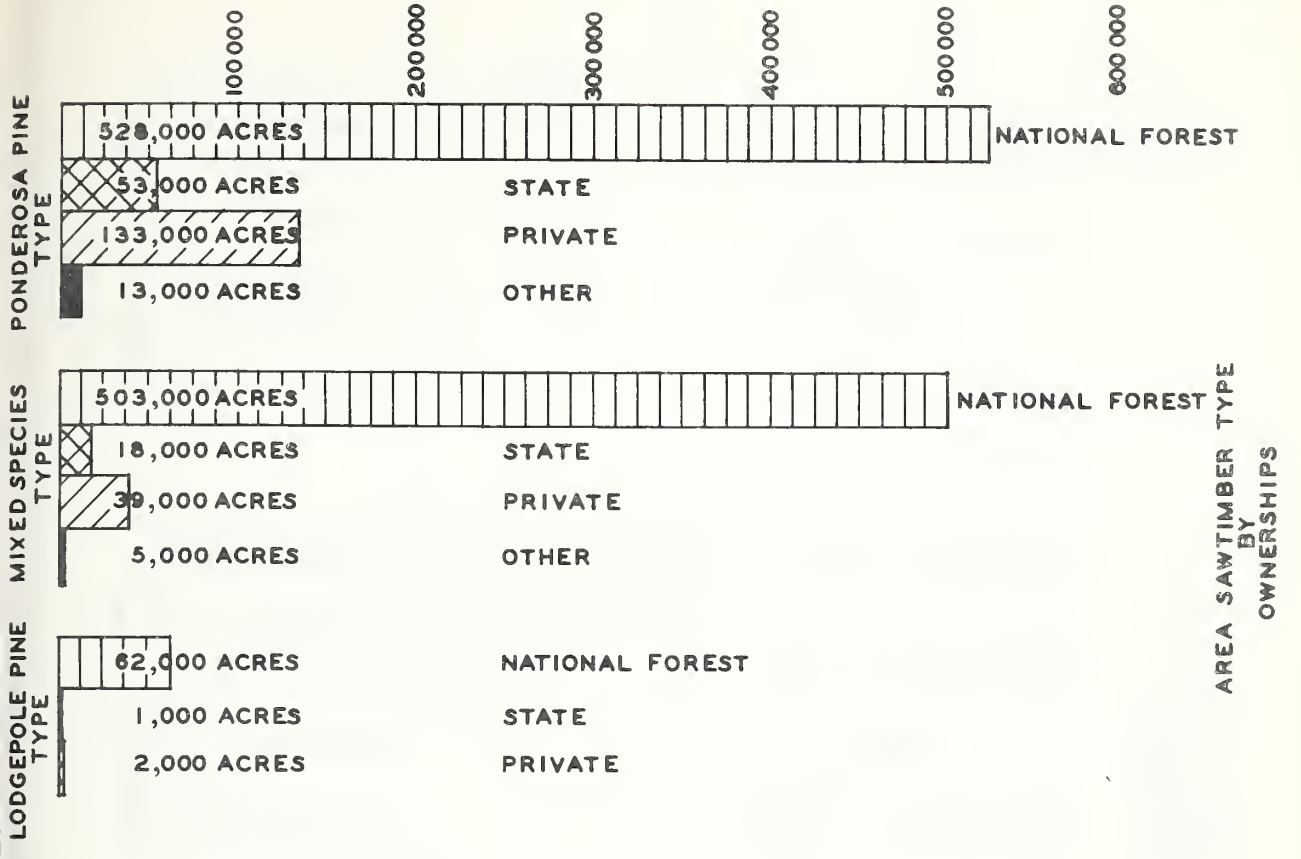
Ponderosa pine is predominant on south and west slopes with varying degrees of associated species. The principal associated species is Douglas fir with some white fir, Engelmann spruce, lodgepole pine and alpine fir (at higher elevations). North and east slopes are predominantly Douglas fir with the other species mentioned above as well as some ponderosa pine occurring in varying degrees.

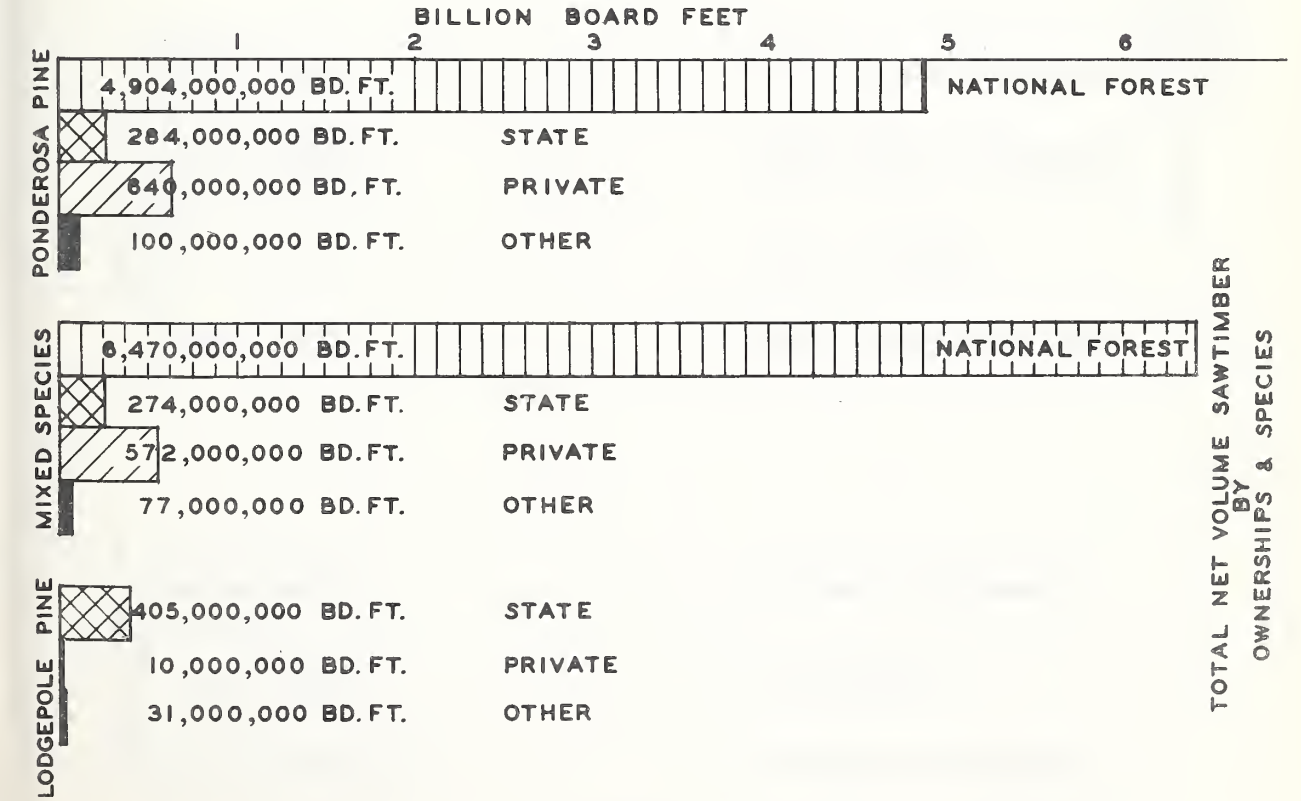
The ponderosa pine found in the working circle is of average

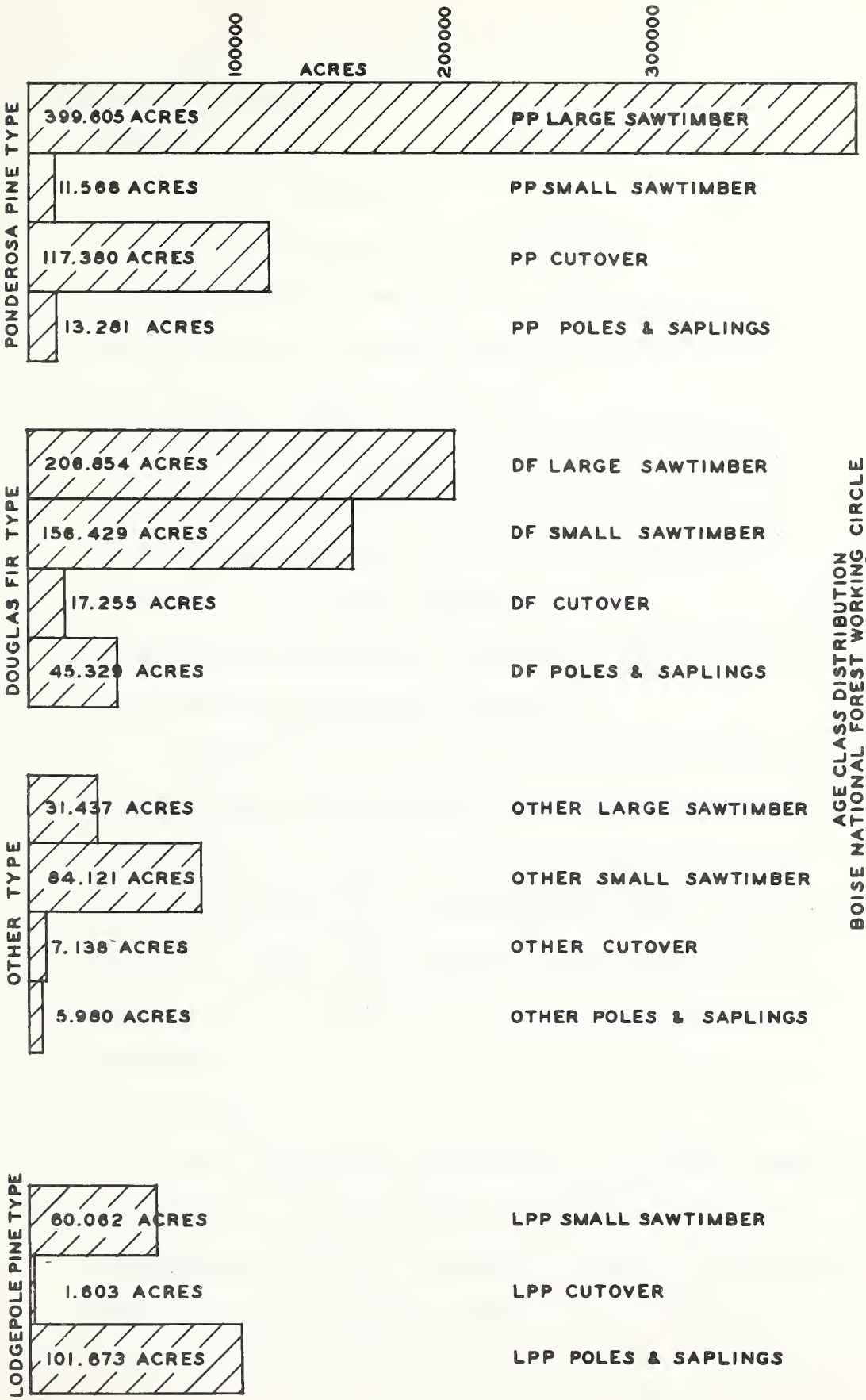
quality, comparing with other stands in southwest Idaho and eastern Oregon.

Douglas fir is, in general, more defective than ponderosa pine, the defect consisting mainly of shake, heart check, rot and crook.

White fir on the area is probably the most defective with deductions for this species running as high as 25%. This defect is caused mainly by rot with considerable shake and heart check.


100 000
200 000
300 000
400 000
500 000
600 000
PONDEROSA PINE TYPE
528,000 ACRES
NATIONAL FOREST
53,000 ACRES
STATE
133,000 ACRES
PRIVATE
13,000 ACRES
OTHER
MIXED SPECIES TYPE
503,000 ACRES
NATIONAL FOREST
18,000 ACRES
STATE
39,000 ACRES
PRIVATE
5,000 ACRES
OTHER
LODGEPOLE PINE TYPE
62,000 ACRES
NATIONAL FOREST
1,000 ACRES
STATE
2,000 ACRES
PRIVATE
AREA SAWTIMBER TYPE BY OWNERSHIPS


BILLION BOARD FEET
1
2
3
4
5
6
PONDEROSA PINE
4,904,000,000 BD. FT.
NATIONAL FOREST
284,000,000 BD. FT.
STATE
840,000,000 BD. FT.
PRIVATE
100,000,000 BD. FT.
OTHER
MIXED SPECIES
6,470,000,000 BD. FT.
NATIONAL FOREST
274,000,000 BD. FT.
STATE
572,000,000 BD. FT.
PRIVATE
77,000,000 BD. FT.
OTHER
LODGEPOLE PINE
405,000,000 BD. FT.
STATE
10,000,000 BD. FT.
PRIVATE
31,000,000 BD. FT.
OTHER
TOTAL NET VOLUME SAWTIMBER BY OWNERSHIPS & SPECIES


100000
200000
300000
ACRES
PONDEROSA PINE TYPE
399.605 ACRES
PP LARGE SAWTIMBER
11.568 ACRES
PP SMALL SAWTIMBER
117.380 ACRES
PP CUTOVER
13.281 ACRES
PP POLES & SAPLINGS
DOUGLAS FIR TYPE
206.854 ACRES
DF LARGE SAWTIMBER
156.429 ACRES
DF SMALL SAWTIMBER
17.255 ACRES
DF CUTOVER
45.320 ACRES
DF POLES & SAPLINGS
OTHER TYPE
31.437 ACRES
OTHER LARGE SAWTIMBER
84.121 ACRES
OTHER SMALL SAWTIMBER
7.138 ACRES
OTHER CUTOVER
5.980 ACRES
OTHER POLES & SAPLINGS
LODGEPOLE PINE TYPE
60.062 ACRES
LPP SMALL SAWTIMBER
1.603 ACRES
LPP CUTOVER
101.673 ACRES
LPP POLES & SAPLINGS
AGE CLASS DISTRIBUTION
BOISE NATIONAL FOREST WORKING CIRCLE
NATIONAL FOREST LAND

4. Management Objectives

a. Community Support

(1) Permanent Communities

The allowable cut will be used to help support the economy of nearby dependent communities. The following are those communities wholly or partially dependent upon timber harvest: Boise, Emmett, Mountain Home, Meridian, Horseshoe Bend, Idaho City, Caldwell, Nampa, Crouch, and Cascade. In addition, there are several very small towns that have some dependency. Further information on these will be found in Section E of this plan. All of these communities are also partly supported by other industries such as agriculture, mining, or other manufacturing or processing industries.

Dependency is, therefore, a variable beyond control and for that reason a free market for the logs and other timber products from the working circle will be maintained.

(2) The present policy of discouraging sawmill construction on national forest land in order to aid in maintaining or establishing wood product industries in communities will be continued.

b. Silvicultural

(1) Obtain prompt stand regeneration. If natural regeneration cannot be secured promptly either with or without scarification it will be necessary to resort to artificial means such as planting or seeding.

(2) Adoption of the "group selection" or "unit area control" system of cutting for the ponderosa pine type, and to the extent found desirable for the other types.

(3) A long-term objective is the attainment of equal distribution of age classes in all types.

(4) Another long-term objective is the improvement of volume stocking in the mature stands. As an example, the pine stands now average 13.6 MBM per acre. Stocking will have to be improved to 20.6 MBM per acre to meet the reasonable goal of 60% of normal yield for age 160. Other types are similar in this characteristic.

5. Coordination with Other Uses

a. Recreation

Scenic attractions are varied and many throughout the forest working circle. During the year 1954 there were 110 camping or picnic areas which had an estimated 238,000 man-days' use, 96 summer homes on six summer home units with an estimated 16,030 man-days' use. Hunters and fishermen are numerous during the open season. The one winter sports area showed 18,000 man-days' use.

The forest is traversed in part by State Highway 15 (North Fork Payette River), State Highway 21 (Idaho City-Stanley) and State Highway 17 (Banks-Lowman). Various other forest roads open up the working circle and as rapidly as possible new roads are being built with access road money or operator-built through allowance in timber appraisals.

Recreation use will continue to increase over the years and provision will be made to preserve roadside strips and present and planned summer home areas, campgrounds, picnic areas, and other recreational sites. Cutting in these areas will be restricted to dead and dying trees, insect and disease infested trees and those leaning or otherwise weak trees known to be a threat to public safety. Thorough cleanup of logging debris will be required.

The continuing expansion of the road system will require an alertness on the part of participating forest officers to appraise each new part of the permanent road system from the recreational angle. Occasional high potential areas may require some preliminary work by qualified recreational planners. If such help is not available and for areas of lesser potential the forest ranger or other delegated forest officer will predetermine the recreational possibilities along each proposed road route and submit to the engineers, along with such maps or aerial photos as are necessary, a list of areas recommended to be left undisturbed for possible future recreational use. In road location the engineers will by-pass such areas to the extent feasible.

Restrictions against cutting in such proposed areas will be the same as those applied in existing recreational areas.

Protection of the scenic strip for a minimum of 200 feet on each side of the right-of-way generally will be required in sale contracts along all forest highways and other designated roads.

Clause 3-29 or 3-30, page 3(f), R-4 Supplement, Sales Procedure, (dated March 1956) will be used in sales contracts where necessary. Roads and parts of roads where the scenic strips will be protected will be designated by the district rangers for each ranger district block and such designation will be made a part of the ranger district supplement to this plan. New road projects will be added currently as proposed.

Ordinarily no commercial timber cutting will be allowed within the scenic strip along such roads except for the removal of dead and dying trees. There are certain conditions, however, where proper silvicultural practices can enhance the recreational values of scenic strips and in these cases the restrictions against cutting in the scenic strips will be relaxed. Included in this category are exceptionally decadent stands of old growth timber containing many high risk individuals. From the recreational standpoint it is also desirable to break the monotony of solid timber stands where they occur along both sides of roads for long stretches. If carefully done these types of cutting will serve the double purpose of improving the timber stand and the scenic qualitites of the roadside strip. Thinning or other improvement cutting in pole and sapling stands will be allowed in the roadside zone to accomplish the same objective. The establishment of demonstration plots to show the public good cutting practices will be encouraged.

All roadside cutting will require extra supervision to preserve natural conditions to the extent possible and will

be followed by thorough cleanup of logging debris. Stumps in these areas will be kept as low as possible.

Due to the fact that it is unlikely that a recreational planner will be on hand at the proper time to check on any proposed cutting within the roadside strips, it will be the responsibility of the forest supervisor or his delegated representative to see that such cutting is kept within the limitations prescribed above.

b. Wildlife

Mule deer, elk, black bear, mountain goats, big horn sheep and fish are the most important forms of wildlife on the forest. Four species of native grouse, blue, ruffed, sage and Franklin, occur on the forest. Hungarian partridge and doves occur also.

Fur-bearers include small populations of muskrat, beaver, marten, and mink. Coyotes, cougar and bobcats are common. Snowshoe rabbits are common while jack and cottontail are less so. Weasel, skunks, badger, fox, woodchucks, and pine squirrels are seen throughout the forest.

Summer range for deer and elk is adequate. In the winter the herds split, part wintering in the South Fork of the Payette River and Middle Fork of the Salmon River, while the remainder winter in the area between Boise and Idaho City.

Early placer mining followed by dredging has materially changed and practically destroyed extensive areas of the streams and trout habitat, particularly in the Boise Basin and Atlanta

area. The Idaho Fish and Game Department has a stream improvement project in an attempt to restore suitable conditions for trout in the old dredge ponds.

Special attention will be given to preserving trees and other streamside vegetation and prevention of damage to stream channels and contamination or pollution of streams by the logging operation for the main purpose of protecting the fish habitat.

c. Water

All of the small communities within the forest depend upon it for their water supply. The towns in Boise Valley depend upon the forest for water for irrigation purposes and as the ground water in the forest goes down, so does the ground water in the valley for domestic water purposes.

The headwaters of the Boise River, part of the headwaters of the Payette River and the headwaters of the Middle Fork of the Salmon River rise and flow through the forest.

The U. S. Bureau of Reclamation has invested huge sums in the reservoirs at Arrow Rock, Anderson Ranch, Cascade, Deadwood, and Black Canyon for power and irrigation purposes, along with their attendant canals and laterals. The U. S. Army has invested heavily in Lucky Peak reservoir for power and flood control purposes.

The forest, therefore, may be considered as a watershed to preserve streamflow for these installations. The agricultural wealth of the Boise and Payette Valleys depends upon

these structures. Wherever possible provision will be made to protect the water supply of all communities affected.

The best approved practices designed to hold erosion to a practical minimum will be used and changed as improved practices are devised. Since the biggest proportion of the forest is composed of granite soils, steep slopes are easily eroded and care with current logging methods must be used.

Standard instructions for the Boise National Forest for erosion control have been prepared and sent to each forest officer and the Regional Office (March 1956). The rangers will be responsible for compliance with these instructions and such revisions as may be necessary from time to time.

d. Grazing

Nearly all of the national forest land has been seriously overgrazed. It has harmed the watershed and affected the timber growing possibilities, especially in the ponderosa pine type. Due to lack of suitable forage in the ponderosa pine type, grazing inhibits seedling growth due to trampling and browsing. The forest permits 6,895 cattle and 30,360 animal months and 75,000 sheep with 280,000 animal months. In 1954 we grazed 6,718 cattle with 30,564 animal months and 78,285 sheep with 283,580 animal months.

Grazing controls will be initiated where necessary on cut-over areas to allow the establishment of regeneration. Each district ranger will be responsible for determining the

period of nonuse and coordinating timber sales and grazing plans in this respect. Grazing restrictions will be lifted as soon as possible following establishment of reproduction. The period of nonuse necessary is expected to vary from a minimum of three to not more than ten years and it will be necessary to establish the period of nonuse individually for each sale area.

e. Mining

Practically all of the forest is in a mineralized zone. Concentrations of mining claims on the forest cause some right-of-way problems. Prospectors have been active since 1950 in the Cascade, Landmark and Bear Valley districts hunting radio-active minerals. A goodly portion of the meadows in these districts have been staked. Patented claims for metals of all kinds are not very numerous but there are many unpatented claims.

Claims staked prior to July 23, 1955, occasionally cause difficulties in getting waiver of timber or rights-of-way. The forest will embark upon a program in 1956 which, it is hoped, will eventually lead to freeing the surface rights on most of the unpatented mining claims.

The new mining legislation will tend to reduce the conflict between mining and timber management activities on both old and new claims. Policies and guidelines in effect are covered in the NF-H5-3 section of the Manual and in various

W. O. and R. O. circulars, copies of which have been sent to each ranger.

f. Experimental Forests

There is one experimental forest within the boundaries of the Boise National Forest. This is divided into two areas, one of 660 acres adjacent to Idaho City and one of 6,810 acres in T. 5 N., R. 6 E., B.M. Besides the above there is one thinning plot of 80 acres, one method of cutting plot of 1,916 acres and the Arrow Rock substation plot for erosion and grazing studies covering 904 acres or a total acreage of approximately 10,370 acres which has been withdrawn by Public Land Orders for experimental purposes. Within these withdrawals various phases of forest management are carried on for the benefit and use of the forests in the ponderosa pine zone in Idaho.

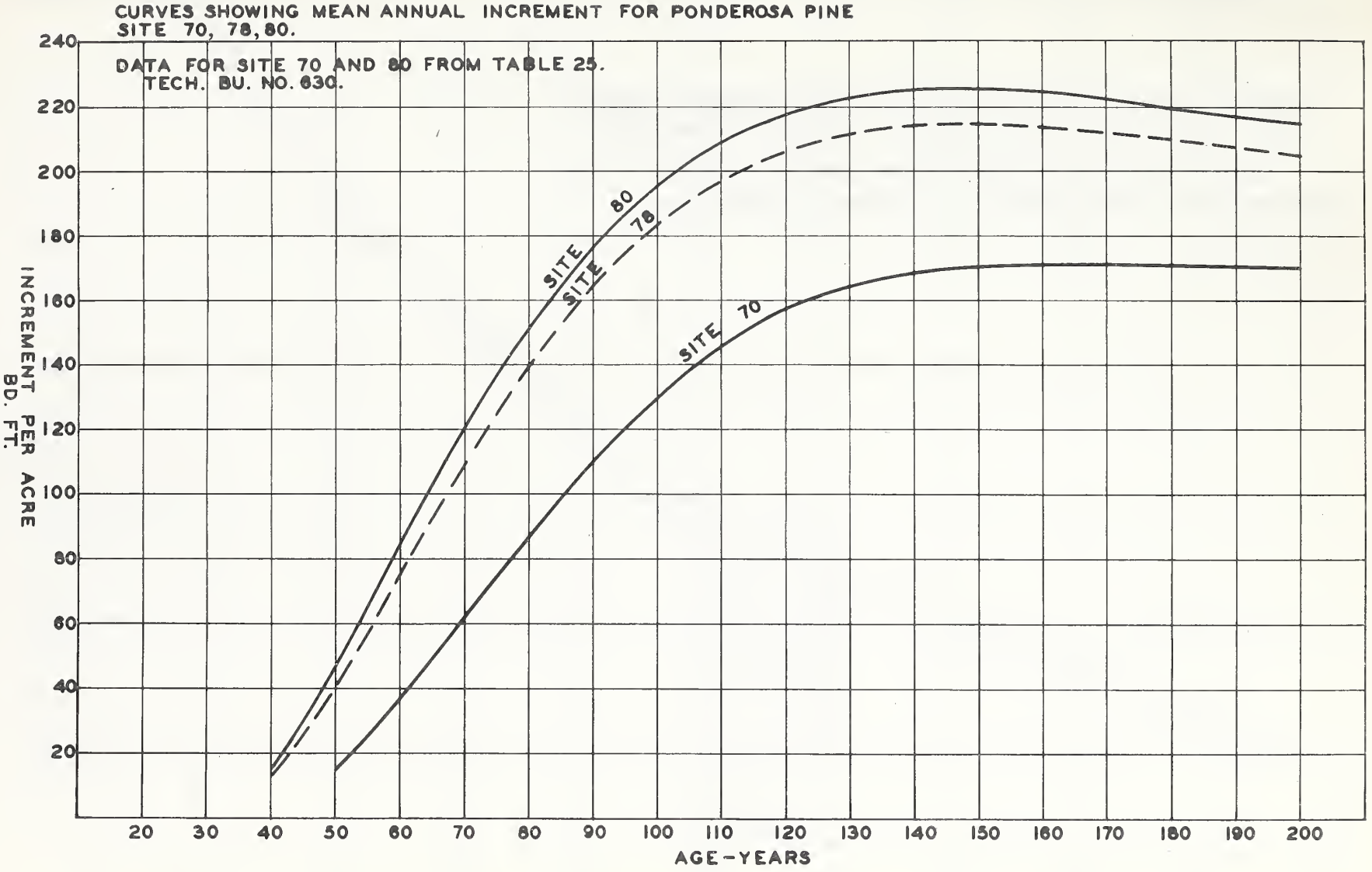
This plan does not include the management, allowable cut or plans for the experimental forest. There is no anticipation that the management of this working circle will conflict in any way with the experimental areas or vice versa.

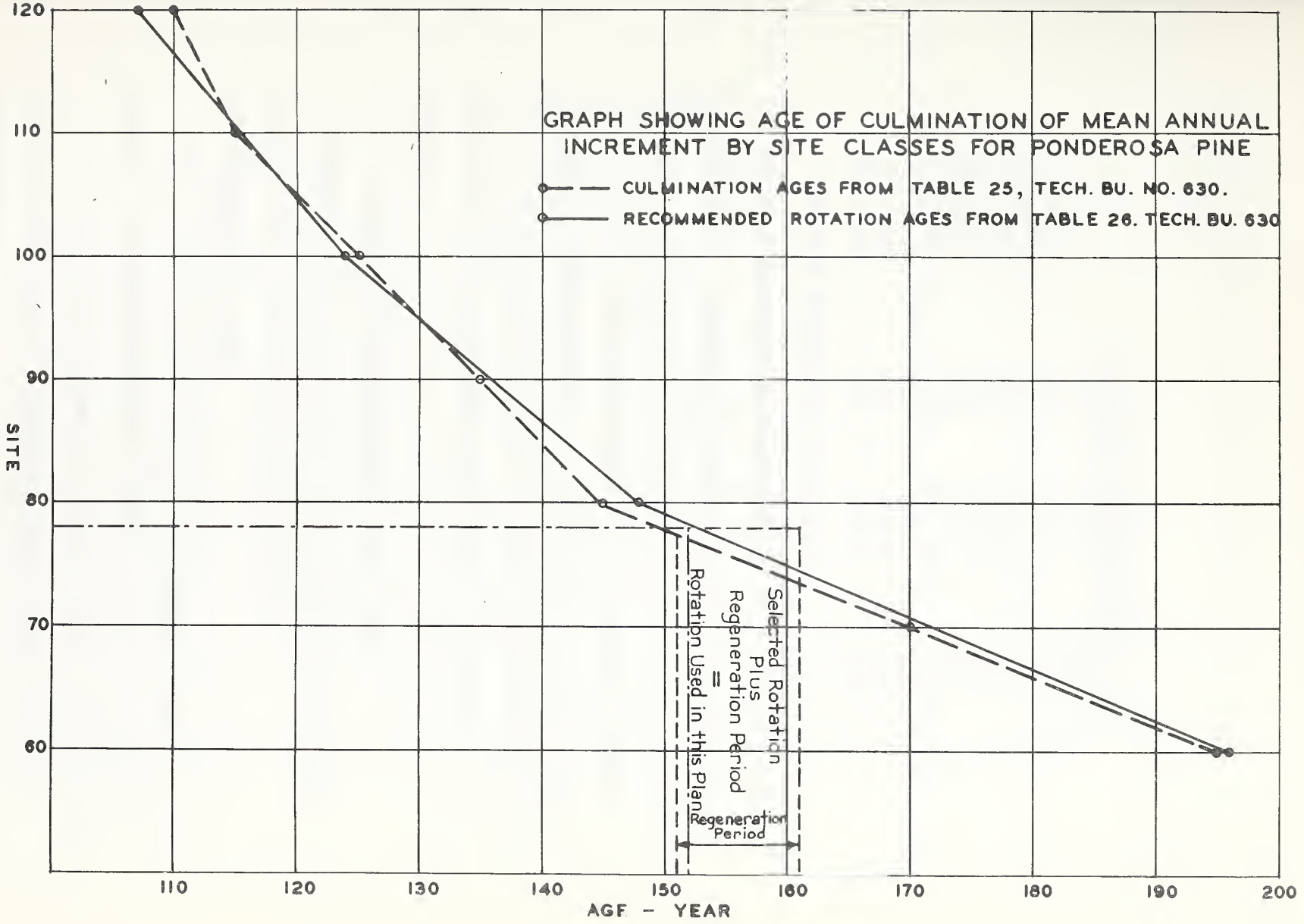
6. Regulation

a. Rotations

(1) Ponderosa pine type

Culmination of mean annual board foot increment for a Site Index 78 (data from the Southwest Idaho TM Study showed this site index) indicates a rotation age of 150 years. Using table No. 25 in Meyers' Bulletin No. 630, "Yield of Even-Aged Stands of Ponderosa Pine",


CURVES SHOWING MEAN ANNUAL INCREMENT FOR PONDEROSA PINE
SITE 70, 78, 80.
DATA FOR SITE 70 AND 80 FROM TABLE 25.
TECH. BU. NO. 630.
INCREMENT PER ACRE
BD. FT.
240
220
200
180
160
140
120
100
80
60
40
20
SITE 80
SITE 78
SITE 70
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
AGE-YEARS


GRAPH SHOWING AGE OF CULMINATION OF MEAN ANNUAL INCREMENT BY SITE CLASSES FOR PONDEROSA PINE
CULMINATION AGES FROM TABLE 25, TECH. BU. NO. 630.
RECOMMENDED ROTATION AGES FROM TABLE 26. TECH. BU. 630
SITE
AGE - YEAR
120
110
100
90
80
70
60
110
120
130
140
150
160
170
180
190
200
Selected Rotation
Plus
Regeneration Period
=
Rotation Used in this Plan
Regeneration Period

calculations show mean annual increment for Site Index 78 as follows:

Age	Mean Annual Increment Site 70	Site 78*	Site 80
120 years	158	206.0	218
130 years	165	211.4	223
140 years	169	213.8	225
150 years	171	214.2	225
160 years	172	213.6	224
170 years	172	212.0	222
180 years	172	210.4	220
190 years	171	207.8	217
200 years	170	206.0	215

*Values obtained by interpolation.

This indicates the maximum mean annual increment at the age 150 years. Because of the difficulties encountered in getting regeneration both naturally and artificially, an additional 10 years are being allowed for a regeneration period. In addition, this extension provides at least nominal recognition of increased quality which a longer rotation should provide. The rotation for the ponderosa pine type is, therefore, set at 160 years.

(2) Mixed Types (Excludes Lodgepole Pine Type)

Since normal yield tables are not available, a 160 year rotation will be set up for these types also.

(3) Lodgepole Pine Type

No yield tables are available for lodgepole pine. For the present, the rotation selected for this species is 100 years as it seems likely that the products from this type will eventually be used in "small wood" utilization plants such as pulpwood installations.

b. Cutting Cycles

(1) Ponderosa Pine

Due to the large extent of overmature stands the desirability of getting over these stands as rapidly as possible to remove high risk trees quickly, a cutting cycle of 20 years is to be used for this type.

(2) Mixed

At the present time the large volume of mixed species has been hard to move because of market conditions and the competition of mixed species from the Coast. Additional roads will have to be developed in addition to those necessary for pine stands. It will be necessary to develop markets for those species to both sell them and construct roads, for which reason, it is believed, a longer cutting cycle and heavier cut will be necessary. A 40-year cutting cycle is, therefore, set up for the plan for mixed species types.

(3) Lodgepole Pine

As the lodgepole pine type will be clear-cut and no intermediate cutting is planned, the cutting cycle will be the same as the rotation i.e., 100 years.

c. Growth and Mortality

Growth and mortality data were obtained from data obtained by the Southwest Idaho Timber Management Study. The following figures are by types:

	Gross Growth	Mortality	Net Growth
	(board feet per acre per year)		
Ponderosa pine			
Virgin	138 to 193	48	90 to 145*
60% of normal yield value	-	-	128**
Cutover	136	46	90
Spruce			
Virgin	243	47	196
Douglas Fir (+ White Fir & Alpine Fir)			
Virgin	227	77	150
Cutover	200	59	141
Lodgepole Pine			
Virgin	92	13	79

*Varies with units
**From Meyers' yield tables.

Growth and mortality data will be strengthened with each remeasurement of the permanent sample plots. The first remeasurement is scheduled to begin in 1957, an average of five years since the Boise plots were established. It is hoped that yield tables can be developed for the various types also within the next few years so that the allowable cut calculations can be made on a sounder basis. Until remeasurements are completed and growth and mortality recomputed, the above figures must be used with considerable discretion.

d. Methods of Cutting

(1) Ponderosa Pine Type

Unit area control will be applied. Unit area control is a method of even-age management which involves application of the proper treatment to each individual stand as it is encountered during orderly progress through

the working circle. It is based on the concept that a ponderosa pine forest is a complex aggregation of small stands (unit areas). Unit area control recognizes that ponderosa pine characteristically occupies sites where it is in competition with other and less desirable vegetation-trees, brush, grass. By emphasizing the need for varying the treatment from small stand to small stand this method of management provides opportunity for all needed silvicultural operations, including weeding, thinning, improvement cuts, sanitation cuts, salvage cuts, release cuts and regeneration cuts. The actual method of stand regeneration may be shelterwood, seed tree or clear-cut and plant or seed. Harvest cuts, which remove the old stand and are followed by its replacement by a new stand, are preferably release cuts (that is, the final shelterwood cut). If, however, advance reproduction is absent, or sparse, the harvest cut becomes a regeneration cut to be followed by natural regeneration, planting, artificial seeding, or a combination of all three. Burning, rodent control, scarification, or other measures may be needed to obtain adequate stocking following regeneration cuts. In the application of unit area control on this working circle unit areas which are subjected to harvest cuts (release or regeneration) will vary in size from less than one acre to rarely more than five acres.

A more detailed and elaborate discussion of unit area control by one of its pioneer advocates, as it applies to certain California conditions, is included in the Appendix. The principles as applied to this unit are comparable.

(2) Douglas fir type

These stands are medium stocked, the young stands even-aged, but at times there is a wide spread between ages. Virgin timber is usually all-aged. Douglas fir is subject to mistletoe, but such infections seldom result in mortality to trees although growth, thrift and quality are affected. Losses are occurring in the fir stands due to Douglas fir bark beetles and to defoliation by spruce budworm. Cutting trees with mistletoe and those in poor vigor and high risk classes will help remedy the situation.

Unit area control is equally well adapted to the management of the Douglas fir type, but there does not appear to be opportunity to apply more than rather crude silviculture to this type during the present cutting cycle, due to the character of the mature and over-mature stands and unsatisfactory market situation. For the present, therefore, heavy selective cuttings will be made. On the average, 40% of the volume will be removed. High risk trees and mistletoe-infected trees will constitute the bulk of the cut, which should result in marked improvement in the quality and thrift of the stands.

(3) Engelmann Spruce Type

This type constitutes a very small part of the area of commercial timber in the working circle. It is confined to moist sites and occurs only in narrow stringers in the creek bottoms.

The system of unit area control can very well be applied to this type and generally will be followed.

(4) Lodgepole Pine Type

Strip or patch clear-cutting will be used in this type.

(5) Marking Rules

General

The use of unit area control will lead to the need for marking guides which will involve additional considerations beyond those which have been commonly in use. The system is new to Region 4 and the Region's best foresters will be called upon to contribute their ideas and to consider alternatives. They will be open-minded and alert for improvements. It will have to be kept in mind at all times that areas and volumes to be cut each year in timber sales will necessarily be strictly limited and will have to be coordinated also with those of other concurrent sales within the working circle. The rules will be subject to revision whenever better ones can be devised or introduced.

During good seed years and when planting stock is available, first priority will be given to regeneration

cutting on areas without reproduction. Natural regeneration will be tried to the extent possible. In these cases, of course, adequate seed trees will need to be left bordering the clear-cut areas and the areas themselves will need to be small enough for natural seed dispersal to cover the area. Full-crowned seed trees will be needed and their distribution must be such that no part of the clear cut areas will be further from a seed tree than the height of the tree unless artificial regeneration is contemplated to supplement natural seeding. Scarification and rodent poisoning will be necessary in such cases. Where slopes are steep some other method than scarification may be needed in the interest of erosion control.

Second priority for clear-cut harvest cuts will be given to those areas where ponderosa pine seedlings, saplings, and poles are already established and well stocked as an understory. Many other guides will be needed in the selection of the unit areas, including priorities to be given to areas where inferior species form the understory and what treatment these areas should receive.

Among other guides for risk cutting, for improvment cutting, and for risk and improvement cutting on areas between clean cut patches, the following will apply to classes of trees to be marked for cutting:

Risk Cut

Ponderosa Pine

1. All trees with more than 50% of the foliage infected with Needle Cast (Elytroderma deformans). Pathologists have been hopeful that infected trees with smaller amounts of the crown infected would recover. This is still an optimistic hope many times not realized.

2. Trees within risk class 4 of Salman and Bongberg's classification. These should include those listed in item 1 above and trees that harbor dendroctonous beetles.

3. Trees with severe mechanical damage, such as wide-spreading forks, heavy lean (over 30°), trees newly struck by lightning, and those so severely burned and/or decayed at the butt that there is danger of their being broken by the wind.

Douglas Fir

1. All trees falling under Wilson's* class 3D

2. Trees top-killed or of low vigor due to mistletoe, spruce budworm or mechanical damage.

White Fir, Alpine Fir, Engelmann Spruce and Lodgepole Pine

1. Trees with spike tops or tops dying from spruce budworm attacks.

2. Trees with severe mechanical damage.

*Wilson, A. K., Tables for Classifying Age and Vigor of Douglas Fir in Central Idaho. Intermountain Forest and Range Experiment Station, 1952, 6 pp.

3. Overmature trees which are susceptible to bark-beetle attack (Engelmann spruce and lodgepole pine) or rot (alpine fir).

Improvement Cut

Ponderosa Pine

1. Trees in Keen's tree classes 4D, 3D, 4C which are needed to bring the budget up to 61.1 MM per year.

2. Severely malformed and wolf trees.

3. Cut to improve spacing or to remove competition of less desirable species.

Douglas Fir

1. All trees which fall within Wilson's class 2D, 3C and 1D.

2. Severely malformed and wolf trees.

3. Cut to improve spacing or reduce competition with more valuable species.

Other Species

1. Severely malformed and wolf trees.

2. Removal of competition with more valuable species.

Salvage Cut

Cut trees of all species that have been so very severely damaged as a result of logging and trees with Needle Cast that have in excess of 50% of their crowns infected so badly as to be expected to die within a year; also cut all dead merchantable trees.

e. Growing Stock Objectives

This item is more fully discussed in the next section under "Calculation of the Allowable Cut." There is, however, one important thing to be kept in mind by the forest managers that is not emphasized in that section.

In the ponderosa pine type the desired volume is shown to be 7,900 bd. ft. per acre. The method of arriving at this figure is shown in the next section. This presupposes growing these standson the average to 20,500 bd. ft. per acre at age 160 years. (From Meyers' Table 16, page 23, by interpolation for Site Index 78, 60% of normal.) These same stands average, at the present time, only 13,600 bd. ft. per acre. Thus an increase in average stocking of mature stands of approximately 7,000 bd. ft. per acre is needed and the minimum average goal for these stands at the time of cutting is 20,500 bd. ft. per acre. To meet this goal, stocking and thrift will have to be improved by management. This emphasizes the need for alert management and prompt and adequate regeneration.

f. Calculation of Allowable Cut

(1) Ponderosa Pine Type

The allowable cut in the ponderosa pine type is calculated by use of the Austrian formula as follows:

$$AC = I + \frac{Vm - Vd}{N}$$

where:

AC = Allowable annual cut

I = Annual Increment

N = Number of years in adjustment period

Vm = Present merchantable volume

Vd = Desired volume

Present merchantable volume is obtained from a summary of the 1951 and 1952 timber survey of the Boise National Forest which follows:

	Vol. MMBM	Area Acres	Av. Stand Per Acre
PP large & small sawtimber	5,601	411,173	13.6
PP large & small cutover	972	117,380	8.3
PP poles and saplings	17	13,281	1.3
Total PP type	6,590	541,834	

Volume 70% PP

A detailed breakdown of volume by blocks will be found in the Appendix.

In addition to the above acreages, there are 92,450 acres of old burns that have not been reforested naturally. When prospective reforestation activity gets under way and satisfactory results are being achieved, these areas will receive attention in the restoration program. The rehabilitated areas will then be included in the calculations incident to periodic revisions of this plan.

Timber volumes and areas in experimental forests are not included in the above tabulation.

Increment is obtained from the growth calculations shown in the Appendix under 4b, "Regulation Calculations." A summary follows:

Condition Class	Area in Acres	Order of Entry and Duration of Harvest Cut	Growth MMBM: Before Harvest Cut	During Harvest Cut	After Harvest Cut	Total
Virgin	411,173	121	-	3,184	2,053	5,237
Cutover	117,380	35	1,278	185	323	1,786
Poles-Sap.	13,281	4	265	7	-	272
Total	541,834	160	1,543	3,376	2,376	7,295

Calculated growth per year during first rotation:

$$\frac{7295 \text{ MM}}{160 \text{ years}} = 45.6 \text{ MM bd. ft.}$$

Calculated annual growth per acre during first rotation:

$$\frac{45{,}600{,}000 \text{ bd. ft.}}{541{,}834 \text{ acres}} = 84 \text{ bd. ft.}$$

Desired volume after cutting is arrived at by what is known as the summation method for getting volume per acre, using table #16 from Meyer's bulletin and interpolating for Site Index 78.

Volume Per Acre
Site Index

Site

Age	70	78	80
40	.1	.5	.6
50	.7	2.0	2.3
60	2.2	4.5	5.1
70	4.3	7.7	8.5
80	7.0	11.2	12.2
90	10.0	14.8	16.0
100	13.1	18.5	19.7
110	16.2	21.7	23.1
120	19.0	24.8	26.2
130	21.5	27.5	29.0
140	23.7	29.9	31.5
150	25.7	32.2	33.8
160	27.5	17.1 = 1/2	35.9

Total for Site Index 78 = 212.4

2,122,000 ÷ 160 = 13.26 (av. normal growing stock per acre during rotation period.)

13.26 x 60% = 7.9 M ft. per acre (discounted because experience has shown actual volume to be about 60% of normal)

541,834 acres x 7.9 M bd. ft. per acre = 4280 MM bd. ft. (desired volume)

Adjustment period in this case is 160 years or the full rotation.

Application of Austrian Formula

All of the factors needed for application of the Austrian formula have now been assembled. To summarize:

I = annual increment = 45.6 MM bd. ft.

Vm = present merchantable volume = 6590 MM bd. ft.

Vd = desired volume = 3901 MM bd. ft.

N = number of years in adjustment period = 160

AC = allowable annual cut

$$AC = I + \frac{Vm - Vd}{N}$$

$$AC = 45.6 \text{ MM} + \frac{6590 \text{ MM} - 4280 \text{ MM}}{160}$$

$$AC = 45.6 \text{ MM} + 14.4 \text{ MM}$$

$$AC = 60.0 \text{ MM}$$

Thus, the allowable annual cut of 60.0 MM bd. ft. consists of 45.6 MM growth plus 14.4 MM of inventory reduction.

Allocation of Cut by Unit Area Control

The silvicultural method of unit area control may be integrated with regulation of cut. This also results in regulation of growing stock.

The types of cutting planned during the initial 20-year cutting cycle and purposes are:

1. Harvest cutting	These small clear cuts are the start in the development of a normal distribution of age classes. They furnish the bulk of the volume over which the cost of road development will be amortized.
a. Release cuts	
b. Regeneration cuts	
2. Intermediate cutting	Risk cuts are selective cuts, which cover mature and overmature stands not clear cut. Improvement cuts may be made in mature and overmature stands, and also in immature stands. Together these cuts remove (1) Trees which would die during the cutting cycle, (2) Diseased or otherwise crippled trees, (3) Undesirable species and (4) Thinnings in dense stands.
a. Risk cuts	
b. Improvement cuts	

The total cut developed under 1 and 2 equals the regulated cut. In addition there is expected to be a considerable, though unpredictable, volume of salvage cutting, which is unregulated.

3. Salvage Cutting	Only dead trees and trees which will die within one (1) year.
a. Before logging	
b. After logging	

The first 20-year cutting cycle will see the development of the permanent road system throughout the ponderosa pine type, since all mature and overmature stands will be entered and there are no large blocks of immature ponderosa pine stands.

During subsequent cutting cycles the same three types of cutting are planned. Harvest cuts on scattered small areas will continue to develop areas of young age classes, thus furthering the development of a normal age class distribution. There may be less risk cutting and more improvement cutting. Salvage cuts will continue to be unregulated.

Harvest Cutting

Under the unit area control method of harvest, to get even-age distribution at the end of a 160 year rotation, it will be necessary to harvest cut each year 3,386 of the 541,834 acres of ponderosa pine type. This will amount to 3,386 x 20 or 67,720 acres during the first cutting cycle.

$$\frac{541{,}834 \text{ acres}}{160 \text{ years}} = 3{,}386 \text{ acres to be cut annually}$$

Clear cutting 3,386 acres annually with an average stand of 13.6 M board feet per acre will result in an annual harvest cut of:

3,386 acres x 13.6 M b.m. = 46.0 MM bd. ft. per year

5,601 MM bd. ft. (vol. in old growth stands ÷ 46.0 MM bd. ft. (cut per year) = 121 years. The number of years during which existing sawtimber stands will be harvested by clear cutting in small groups.) This checks with

$$\frac{411{,}173 \text{ acres of PP large and small sawtimber}}{3{,}386 \text{ acres annual cut}} = 121 \text{ yrs.}$$

It has been shown previously that the approach to normal distribution of age classes calls for making harvest cuts on a total of 3,386 acres annually. If 3,386 acres

are clear cut per year, the average yield would be 3,386 acres x 13.6 M or 46.0 MM bd. ft. per year. Area will be the regulating factor for this type of cutting and will be limited on the basis of total acreage for a five-year period or to a rounded figure of 17,000 acres for that period.

Intermediate Cutting

Improvement Cut

The allowable annual cut is 60.0 MM bd. ft., but harvest cutting is expected to produce only 46.0 MM bd. ft. a year. This leaves 60.0 - 46.0, or 14.0 MM bd. ft. annually for removal in improvement cuts. Thus the allowable cut of 60.0 MM bd. ft. which is calculated to consist of 45.6 MM bd. ft. of increment, plus 14.4 MM bd. ft. of reduction in inventory, is planned to be applied as 46.0 MM bd. ft. of harvest cutting plus 14.0 MM bd. ft. of improvement cutting.

When it happens that the 3,386 acres to be clear cut in any one year average substantially more or less than the computed 13.6 M per acre the surplus or the deficit will be offset by a lighter or a heavier intermediate cut that year. Thus volume as well as area budgeted for cutting will be kept on schedule.

Risk Cut

The 411,173 acres of virgin timber contains many high risk trees which are sure to die during the first cutting cycle. This in part accounts for the decision to disregard

the computed growth of 90 to 145 bd. ft. per acre per year on virgin stands (pages 30 and 46). To the extent that these high risk trees can be identified, their cutting will merely reduce mortality during the cutting cycle. Planned removal of high risk trees, therefore, is in addition to the calculated allowable annual cut of 60.0 MM bd. ft. developed above.

Alec Jaenicke of Region 6 has developed through rather extensive studies in the pine region of Eastern Oregon for risk cut a figure of 10% of the volume of mature stands. This 10%, however, cannot be applied to the total volume because a portion of that total volume is liquidated each year in harvest cuts. The plan provides for cutting over the virgin sawtimber area during the first 20-year cutting cycle. The 411,173 acres of sawtimber will be reduced during that period to 343,453 acres by reason of clear cutting 3,386 acres each year for 20 years or a total of 67,720 acres. It is on the 343,453 acres that the improvement cut and risk cut will be made during the first cutting cycle. The volume on this area is 343,453 acres x 13.6 M bd. ft., or a total of 4,671 MM bd. ft. One-tenth of this volume is 467.1 MM bd. ft., which is the volume of risk cutting to be removed over a 20-year period. The annual volume to be removed is $\frac{467.1}{20}$ or 23.3 MM.

On the basis of the above discussions, the regulated annual cut for the pine type will be:

	Volume MMBM	Area Acres
1. Harvest Cut		
a. Release Cut b. Regeneration Cut	46.0	3,386
2. Intermediate Cut		
a. Risk	23.3	
b. Improvement	14.0	17,173
Total Regulated Annual Cut	83.3	20,559

The area to be covered by the combined risk and improvement cut which will average 2.2 M per acre is 17,173 acres per year or 85,865 acres in the five-year budget period. This will be rounded to 85,900 acres for the purpose of control.

The above indicates 83.3 MM bd. ft. annual cut and the calculated allowable cut for the same type is 60.0 MM bd. ft. per year. The difference is the 23.3 MM bd. ft. risk cut. If this cutting is done skillfully the trees cut will be those which would die during the cutting cycle if they were not cut, thus growing stock would be reduced whether or not the trees were cut. Risk cutting is a form of salvage in advance or mortality anticipation.

Mortality (page 30) has averaged 48 bd. ft. per acre per year in the virgin ponderosa pine stands. Assuming that this rate will continue, 48 x 20 or 960 bd. ft. (rounded to 1 M) would be lost during one cutting cycle. Risk cutting should remove all or nearly all of this loss leaving 2.2 - 1.0 or 1.2 M bd. ft. per acre to be removed in additional risk cutting or in improvement cutting.

Assuming that skillful risk cutting will remove all or nearly all of the trees which would die during the cutting cycle the difference, or 1.2 M must be replaced by growth after intermediate cutting.

As discussed on pages 44 and 103, no growth on virgin stands prior to harvest cutting has been allowed in the growth calculations. However, in order to maintain the harvest cut at the calculated rate of 13.6 M bd. ft. per acre some growth in these stands is necessary following intermediate cutting. This growth can be termed replacement growth and should amount to at least 1.2 M per acre during the cutting cycle. A net growth of 60 bd. ft. per acre per year on these stands would accomplish this replacement. Net growth on these stands after risk and improvement cutting may be more than this amount but will probably not be less. The first remeasurement of the permanent sample plots will show what the actual growth has been. Adjustments in the allowable cut can be made at that time, if actual net growth is found to be substantially different from the average of 60 bd. ft. per acre per year needed for replacement.

Species Apportionment of Regulated Cut

The total cut developed under 1 and 2 on page 45 equals the regulated cut of 83.3 MM bd. ft. per year.

Timber survey data indicate that in the ponderosa pine type 70% of the volume is ponderosa pine species and 30% is mixed species.

83.3 MM bd. ft. x 70% = 58.3 MM bd. ft. annual cut PP

83.3 MM bd. ft. x 30% = 25.0 MM bd. ft. annual cut mixed

Unregulated Cut - Salvage Cutting

In addition to this regulated cut it is important to consider in ponderosa pine working circles the salvage of dead timber and trees which are sure to die within one year after logging. Salvage can be done before cutting to the extent the material can be reached from existing roads. Salvage after cutting is necessary on most sales. Whatever volume is developed in salvage cutting is in addition to the regulated cut. Although the volume of this class of material is unpredictable, it is estimated that approximately 3,125 M bd. ft. per year would be removed in this manner.

(2) Mixed Types (all other types except lodgepole pine)

Stand data are as follows:

	Volume MM Bd. Ft.	Area Acres	Av. Volume Per Acre MM Bd. Ft.
Large & small sawtimber	4,654	478,861	9.7
Large & small cutover	189	24,393	7.7
Poles and saplings	31	51,310	.6
	4,874 MM	554,564	8.8

Because of the age and condition of the stands, 40% of the volume from virgin stands will be removed during the first cutting cycle. This will be:

$\frac{478,861 \text{ ac.}}{40 \text{ year cc}}$ = 11,972 acres to be cut per year during first cutting cycle.

9.7 M bd. ft. per acre x 40% = 3.9 M bd. ft. per acre

11,972 acres x 3.9 M bd. ft. = 46.7 MM bd. ft. per year

Timber survey data indicate that in the mixed types 6% of the volume is ponderosa pine and 94% is mixed species.

6% x 46.7 MM bd. ft. per year = 2.8 MM bd. ft. of PP

94% x 46.7 MM bd. ft. per year = 43.8 MM bd. ft. mixed

(3) Summary of the Regulated Allowable Annual Cut

Type	PP	Mixed	Total
PP	58.3	25.0	83.3
Mixed	2.8	43.8	46.6
Total	61.1	68.8	129.9
	45%	55%	100%

(4) Lodgepole Pine Type

The allowable cut for the lodgepole pine type will not be included as a part of the regulated cut until such time as a market is developed for the products from that type.

Stand data are as follows:

	Acres	Total Vol. MBM	Total Vol. M Cords	Per Acre MBM	Per Acre *Cords
Sawtimber	60,062	189	590	3.1	9.6
Cutover	1,603	6	19	3.7	11.7
Poles	87,905	120	771	1.4	8.8
Saplings	13,768	-	-	-	-
Total	163,338	315	1,380	-	-

*Cord volume is sawtimber plus pole volume or all live non-cull material in the stand above 5" d.b.h.

Using Kemp's formula calculations of the allowable cut were made in cords as well as board feet. This was done because of the likelihood of the market to develop as a small product market, such as pulpwood. Board foot volume used in the calculations contained herein consisted only of that material above 11" d.b.h.

Allowable cut:

8.4 MM bd. ft. per year or 26.1 M cords per year.

Composition of the stands is 64% lodgepole pine and 36% other species (mostly Douglas fir, alpine fir and Engelmann spruce).

REGULATED ANNUAL CUT BY BLOCKS
MMBM

Name of Block	Block No.	Ponderosa Pine Type		Mixed Type	
		PP	Mixed	PP	Mixed
Pine	D-1	4.9	1.7	.1	2.4
Cottonwood	D-2	3.9	1.4	.1	2.1
Idaho City	D-3	6.9	2.6	.1	1.9
Atlanta	D-4	4.0	1.4	.4	5.5
Lowman	D-5	13.2	4.9	.4	5.9
Emmett	D-6	5.2	2.5	.4	2.6
Garden Valley	D-7	12.1	6.0	.2	2.3
Bear Valley	D-8	1.8	.9	.5	7.6
Cascade	D-9	5.8	3.4	.4	6.3
Landmark	D-10	.5	.2	.2	7.2
Total		58.3	25.0	2.8	43.8

Lodgepole pine and salvage cutting in all types is unregulated.

7. Sales Policy

a. Size of Sales

The size of any sale will normally depend upon marketing development and silvicultural needs. The rate of cutting within the limits set up in the management plan for the working circle and fairness to the operator who must risk his money shall be taken into account. Normally, the largest numbers of sales will be made under the forest supervisor's authorization (10,000 M bd. ft.), with a few under the regional forester's authorization and with an occasional Chief's sale. The majority of the sales will be in amounts of 200 M to 10,000 M bd. ft., all species, and extending in length from 1 to 5 years. Most supervisor's sales will be of 1 to 3 year's duration.

b. Sales Policy

The stands will be cut lightly, within practical limits, in order to cover all areas by the end of the first cutting cycle and to the extent possible, to remove all dead, diseased, deformed, defective, and overripe trees which are merchantable.

The goal shall be to keep the stand in such a condition as to insure an adequate amount of growing stock of the different age classes.

Better utilization of all species, especially the mixed, will be encouraged.

Protection and care for sale areas by allowing adequate allowance in sales appraisal for the work which needs to be done.

Every effort should be made to market the allowable cut each year through advance preparation of sales, and a sound and realistic program of road construction aimed toward opening up the stands for efficient and quick transportation of stumpage to points of primary manufacture.

At the present time the following are points of manufacture for finished lumber from the working circle: Boise, Meridian, Emmett, Caldwell, Mountain Home, and Horseshoe Bend. Rough manufacturing, besides the above places, is carried on by smaller operators scattered throughout the working circle. However, their cut is usually absorbed by the larger mills in the above-mentioned places.

c. Merchantability Specifications

Merchantability specifications by species are as follows:

	PP	DF, WF, AF	ES	LP
Stump height, in.	14	14	14	12
DBH	12	16	16	12
Top DIB, inches	8	10	8	6
Log length, ft.	8	8	8	8
Tree	1-8' log 25% vol. sound	1-8' log 50% vol. sound	1-8' log 50% vol. sound	1-8' log 25% vol. sound
Log	33-1/3% sound 8' & 8" top 10 bd. ft.	50% sound 8'&10" top 30 bd. ft.	50% sound 8'&8" top 10 bd. ft.	33-1/3% sound 8'&6" top 5 bd. ft.

Trim allowance, all species - logs 6" DIB and over, 8' to 16', 6" trim allowance

These standards are not fixed but subject to change as better data become available and closer utilization is practiced by industry.

We should strive toward the following:

	PP & Mixed	LP
Stump height, inches	14	12
DBH, inches	12	10
Top DIB, inches	8	6
Log length, feet	8	8
Tree	1-8' log 25% of vol. sound	1-8' log 25% of vol. sound
Log	25% sound 8' & 8" top 10 bd. ft.	25% sound 8' & 6" top 5 bd. ft.

d. Logging Methods

Sale contracts should specify the type of equipment to be used on each sale area so as to prevent the least possible damage to the soil and the residual stand.

The logging method to be used will depend on the type of stand topography. Normally, tractor equipment will be permitted on level to moderate slopes as well as jammer skidding along roads.

In steep areas, jammer skidding shall be used or some sort of skyline system, if proved feasible and not too costly. This type of skidding is less detrimental to the residual stand.

Road building will be controlled through contractural specifications which will be made part of the timber sale contracts.

Every effort to eliminate waste should be made. Prevention of undue erosion to the road must constantly be borne in mind and no logging done where skid trails cannot be repaired satisfactorily. There will be close cooperation between the forest and research on this problem and every advantage taken of new method of controlling erosion made by research.

8. Forest Development

a. Transportation

(1) Present System

The present system is composed to a large extent of administrative and protection class roads which are not properly designed to serve efficiently for modern-day logging. Considerable progress has been made during the past five years in bettering a portion of these roads. This betterment in some instances has been to the minimum.

Records in the forest supervisor's office indicate that there are in the forest development roads 804 miles of adequate road with an additional 691 miles either in need of betterment, reconstruction or new construction. Satisfactory forest highway amounts to 103 miles with approximately 93 miles needing betterment and 6 miles nonexistent.

(2) Utilization Road Needs

The following table shows the five-year access road plans for this working circle. This plan calls for 129 miles of reconstruction and 239 miles of new construction. Part of this should be accomplished through Government funds. More details of this plan are on file in the office of the forest supervisor.

FIVE-YEAR ACCESS ROAD ACTION PLAN
SYSTEM ROADS ONLY
TO SERVE NATIONAL FOREST TIMBER SALES
1956 - 1960

Road Name	Project No.	Unit No.	Kind of Work Planned	Miles	Estimated Cost
*Middle Fork Boise River-Lostman-Roaring River Spur	631	D-2 & D-4	Const.	20.6	$ 439,800
*Middle Fork Boise River-Fail Creek	631	D-4	Bridge		5,500
Clear Creek-Stanley-Fern & Monument Creeks	146	D-5	Reconst.	2.5	49,800
Beaver Creek-Swanholm-Upper Crooked River	76A	D-5	Const.	5.5	76,500
Idaho City-Stanley-Chapman Creek Spur	25A	D-5	Const.	1.5	22,500
Old Long Valley-Sam's Meadow	139	D-6	Reconst.	2.0	26,600
Sagehen Basin	851	D-6	Const.	3.0	63,000
*Steer Creek-Williams Creek	973	D-6	Const.	16.7	453,800
*Deadwood, Section #1	150	D-7	Const.	8.5	351,000
*Middle Fork Payette	145	D-7	Const.	5.5	189,500
South Fork Salmon-Upper Dollar Creek	88B	D-9	Const.	3.5	36,700
Fall Creek-Rocky Bar	709	D-1	Reconst.	1.0	4,950
Slide Gulch-Sheep Creek Spur	91	D-2	Const.	5.0	67,100
*Idaho City-Owl Creek-French Creek Spur	712	D-2 & D-3	Const.	18.0	355,600
*Idaho City-Horseshoe Bend, Section #1	799	D-3	Reconst.	20.0	880,000
Beaver Creek-Swanholm-Robert E. Lee	76	D-4	Bridge		5,500
Clear Creek-Stanley-Red Mtn. Spur	146	D-5	Const.	3.0	36,000
Idaho City-Stanley-Ten Mile Spur	25A	D-5	Const.	4.5	67,500
Idaho City-Stanley-MacDonald Creek Spur	25A	D-5	Const.	1.5	39,000
Beaver Creek-Swanholm, Little Beaver Creek Spur	76A	D-5	Const.	2.5	33,500
*Squaw Valley, Squaw Creek Spur	154	D-6	Reconst.	21.0	264,400
Second Fork	701	D-6	Const.	6.0	72,000
Middle Fork Payette, Six Mile Spur #3	145	D-7	Const.	2.0	27,200
Middle Fork Payette, West Fork Spur #1	145	D-7	Const.	3.5	47,100
*South Fork Salmon, Mormon Cr. Spur, Stolle Mdw. Spur	88B	D-9	Const.	7.0	91,000
*South Fork Salmon, Stolle Meadow Section	88	D-9	Const.	4.0	52,000

*Planned for government construction--all others purchaser construction.

Road Name	Project No.	Unit No.	Kind of Work Planned	Miles	Estimated Cost
Artillery Dome Road, Burnt Log	822	D-10	Const.	6.2	49,000
*Dixie-Atlanta, Trinity Cr. Spur	921	D-1	Const.	5.5	238,000
*Idaho City-Horseshoe Bend, Section #2	799	D-3	Reconst.	16.0	880,000
Cascade-Knox	22	D-9	Reconst.	10.0	350,000
Middle Fork Boise, Arrowrock to Dutch Creek	631	D-4	Reconst.	42.0	144,600
Knox-Yellow Pine, Ditch Creek, Sheep Cr., Lunch Cr.	148	D-10	Reconst.	11.5	70,000
Old Long Valley, Soldier Creek Spur	139	D-6	Const.	7.0	140,000
Middle Fork Payette, Scriver Cr. Spur	788	D-7	Const.	1.5	17,000
Middle Fork Payette, West Fork Spur #2	145	D-7	Const.	2.0	27,200
Middle Fork Payette, West Fork Spur #3, Lightning Cr. Spur, Sixteen-to-One Spur	145	D-7	Const.	20.5	643,700
Dutch Creek, Horsethief Spur	650	D-9	Const.	5.2	74,500
*Deadwood River, Section #2	150	D-8	Const.	16.0	882,000
Old Long Valley, Long Pine Creek Spur	139	D-6	Const.	4.0	54,900
Beaver Creek-Swanholm, Upper Pikes Fork	76A	D-5	Reconst.	3.0	40,500
Idaho City-Owl Creek, Lost Creek Spur	712	D-5	Const.	4.5	62,000
Knox-Yellow Pine-Riordan Lake Spur	148	D-10	Const.	11.5	65,500
Deadwood River, West side of reservoir	150	D-8	Const.	9.2	83,000
Clear Creek-Stanley	146	D-5	Const.	8.5	227,000
Beaver Creek-Swanholm, Lower Crooked River	76	D-5	Const.	16.0	722,000

*Planned for government construction--all others purchaser construction.

b. Planting

(1) Needs

Planting needs within the working circle fall within two categories. The first consists of those deforested lands on which natural regeneration is lacking or is so negligible that they are essentially areas out of production. The second type consists of those lands which have been or are being cut over and upon which planting is necessary to supplement or speed up the natural revegetation processes.

The need of planting has long been recognized, the remedy slow, and the results, until recently, disheartening. Approximately 1,720 acres have been planted with 25 per cent resulting in complete failures and much of the remainder in an understocked category.

Encouragement has been received from recent planting experiments conducted on the forest which indicate that certain site preparation measures and better planting techniques can result in an efficient and practical successful planting program. Based upon these techniques, it is planned to proceed with an accelerated program.

Deforested commercial timber lands comprise some 92,000 acres within the working circle. Of this, 25,000 acres is within the Garden Valley District and 30,000 acres within the Idaho City District boundaries. These two blocks, now primarily brush-covered, contain some of the most productive timber sites on the forest.

The amount of cutover land is 143,000 acres. Some of this is in need of replanting and will be considered in any future planting program as deemed necessary to secure adequate stocking providing funds can be obtained.

Plans now exist for the planting of 2,800 acres of recently cut or soon-to-be cut lands. K-V funds are available or are being collected for this purpose.

(2) Policy

The fundamental policy of the Boise will be to restock deforested and cutover lands as quickly as possible in order to realize the most from the site potential.

It will be the policy to fully analyze each timber sale area at the time a cruise is made to determine the need for artificial measures. K-V funds will be collected based upon the anticipated needs of each sale area.

Full advantage will be taken of natural seed fall to accomplish the objective of complete stocking. If necessary, ground preparation, rodent control, and other proved measures will be used to assist the natural process. As a general rule three years will be allowed to determine the need for planting before activating a program.

(3) Program

The program on deforested lands will, of necessity, be contingent upon available appropriations, An adequate site analysis will be maintained to establish site priorities for such a program. Procedures for the establishment of

plantations on deforested lands will be based upon the techniques developed on the Town Creek project since that site is characteristic of most of the deforested lands on the Boise.

An annual estimate of the K-V planting program will be made in order to establish priorities for individual planting areas. This is necessary in order to take advantage of any shifts of need and changes in availability of planting stock.

At the present time 2,800 acres of closed and active sale areas are in need of planting. Funds are now available or are being collected to plant these areas as rapidly as transplant stock can be made available. It is, therefore, essential that an assured and adequate source of transplant stock be made available to the forest in order to sustain a planned program.

A three-week planting period and slowness of present methods limits the yearly program to between 600-650 thousand trees without entering into an emergency program. It is desirable that this number be maintained or increased so that the planting work can be coordinated with other forest activities during that period of the year.

Seed collection of ponderosa pine will be made each year that a cone crop appears. In order to take advantage of both heredity and environment cones will be collected from selected trees on or near sites where replanting is to be done.

c. Timber Stand Improvement

(1) Needs

Nearly all commercial timber lands within the working circle are in need of timber stand improvement of one form or another. With the increasing amount of interest shown by industry in timber grades, better quality, and the use of less desirable species for products, it is essential that full use of progressive silvicultural practices be applied to timber sales. To administer such a program it is desirable that technically-trained personnel plan and supervise the TSI program.

Approximately 166,000 acres of poles and saplings occur on the forest. Of these, 13,000 are ponderosa pine and Douglas fir type which are particularly in need of some form of TSI treatment. In addition there are about 168,000 acres of small Douglas fir and ponderosa pine commercial timber which is in need of some degree of improvement. Unfortunately, funds for improvement work on the above types are not available except under an emergency work program which is not anticipated at this time.

At the present time the 600,000 acres of large commercial type timber provide a fertile and most practical area for the accomplishment of TSI work. On these areas which are being progressively cut, collections are made under the K-V Act for carrying out the TSI program. Work on these areas usually consists of pruning of crop trees,

crop tree release, and limited destruction of worthless trees.

(2) Policy

Planning of sale area betterment work will be guided by manual regulations, regional supplements, and forest directives. As a general rule, TSI plans will be prepared for all sales. The type and amount of work to be planned will be determined by cruise estimates made for the preparation of the sale and from such data an appraisal of work will be made for each sale area. In general, the TSI program will be limited to pruning of crop trees, release of crop trees, and the destruction of worthless trees. In each appraisal, maximum consideration will be given to the amount of sale area betterment work that can be accomplished during the logging operation. In all cases perference will be given to the accomplishment of a maximum amount of improvement work on high-quality sites.

(3) Program

A vigorous timber stand improvement program will be carried out on each ranger district utilizing the latest approved practices and techniques. The action program for each sale will be determined by on-site evaluations made during the pre-sale cruise. Such data will be used as a basis for determining the amount of work to be done, K-V collection, and priority of work.

All timber stand improvement work will be done in accordance with established regional policy and forest guidelines. In general, pruning of crop trees, release of crop trees, and limited destruction of worthless trees will receive first priority to accomplish such work. Provision will be made by each ranger to provide adequate manpower to keep abreast of the job so that no backlog of work and accumulation of funds results.

In all cases, the above silvicultural practices will be accomplished as much as possible through improvement, salvage, and sanitation cuttings under regular sales procedures.

d. Insect and Disease Control

(1) Problem

(a) Insects

In 1954 an insect survey was made by Grossenbach and Johannessen from the regional office which pointed out the areas infested. This report is entitled "Report on Insect Damage Survey of Boise National Forest, September 7-14, 1954" on file in the supervisor's office.

1 Western Pine Beetle (Dendroctonous brevicomis). There is a heavy endemic population of western pine beetle throughout the forest. The heaviest concentrations appear to be in Smith Creek on the Pine and Cottonwood Districts, in French Creek, Logging Gulch, Short Creek and Meadow Creek on the Cottonwood and

Idaho City Districts, Lost Creek on the Atlanta District, Beaver Creek-Crooked River-Owl Creek and South Fork of Payette River above Eightmile Creek on the south side of the river on the Lowman District, Squaw Creek above Woudard Camp on the High Valley District and in Whitehawk Creek on the Bear Valley District.

2 Douglas Fir Bark Beetle (Dendroctonous pseudotsuge).--A heavy endemic infestation of this beetle is prevalent throughout the forest with many localized areas containing epidemic proportions. Every ranger district has been hit. Losses are large and estimated to be 8-10 million board feet. This beetle has probably caused more damage than any other, due to difficulty of control and salvage. At the present time the economic value of Douglas fir has a low value, which helps to increase the difficulty of salvaging.

3 Engelmann Spruce Beetle (Dendroctonous engelmanni).--This appears to be on the increase in the spruce areas in the South Fork Salmon River, above Stolle Meadows; in the Johnson Creek areas; and in Curtis Creek in the Long Valley and Thunder Mountain Districts. At the present time control through logging is being practiced in the Johnson Creek area.

4 Spruce Budworm (Christoneura fumiferana).--Over a third of the forest has been infested with spruce budworm. Heaviest damage has been in alpine fir with Douglas fir and spruce having lesser damage.

At the present time the heaviest damage and mortality, particularly in alpine fir and Douglas fir, occur in the Pistol Creek drainage on the Thunder Mountain District and the North Fork Boise River above Graham on the Lowman District. Heavy to moderate damage has taken place in the Middle Fork Boise River above Black Warrior Creek, excepting the Yuba River drainage from Deer Park to Graham G. S., including Johnson Creek near Graham G. S., and the heads of Clear, Eightmile, Warm Springs and Canyon Creeks on the South Fork Payette River and above Grandjean, and between Deadwood Reservoir and Whitehawk Ridge. A large amount of top kill as well as heavy defoliation occurred in these areas. Considerable mortality also occurred.

A highly effective aerial spray project was initiated in 1955 for the control of this insect. Results from the project were very good. It is planned to treat additional area in 1956. This area is outside of that sprayed in 1955 and should, if estimates and predictions are correct, control the damage being done by this insect.

5 Mountain Pine Beetle (Dendroctonus monticolae).--Some loss is occurring in ponderosa pine stands in the Bear Valley District, and in lodgepole stands on other districts on the forest. Huge losses were experienced in 1925-1934 in lodgepole stands in the Bear Valley and Thunder Mountain Districts.

6 Pine Butterfly (Neophasia menapia).--A buildup occurred in 1952-1953 in the Atlanta, Lowman, and Bear Valley Districts. A control project initiated in 1954 was very successful with over a 90% kill. Salvage logging has been taking place in these areas.

7 Turpentine Beetle (Dendroctonus valens).--The turpentine beetle has been the cause of death in a large number of needle cast weakened trees and kills occasionally in certain areas and fire damaged trees. Losses in volume are sporadic.

8 Pine Engraver Beetles (Ips spp.).--Ips is top killing in the larger merchantable sized trees over the forest generally. An area of about 25 acres in the head of Clear Creek on the Long Valley District is the most seriously affected at the present time.

(b) Diseases

1 Needle cast (Elytroderma deformans).--Needle cast is probably prevalent over the entire forest, but the hardest hit areas to date have been in the Warm Lake

area on the Long Valley District and in the Pikes Fork-Crooked River area on the Lowman District. Logging of the diseased trees has been taking place for the last several years in the above-named areas. According to Dr. J. L. Mielke, Pathologist from the Intermountain Station, present indications are that the disease is lessening in intensity.

2 Brown Root Rot (Fomes annosus).--It has only been in recent years that much attention has been paid to this disease on the forest. Belief exists that this rot has resulted in a general weakening of ponderosa pine trees making them susceptible to insect attacks or killing the tree outright. The extent of damage is not known at the present time.

3 Dwarf Mistletoe (Razoumofskya spp.).-- Mistletoe is causing large amounts of damage in Douglas fir and ponderosa pine. The damage results in deformed trees with loss in merchantability and general weakening of trees attacked, especially in reproduction.

(c) Porcupines must be controlled and reduced to small numbers so as not to do serious damage.

(2) Policy

The policy will be for all rangers and timber staffmen to become familiar with and able to recognize its

status and progress of the aforementioned insects and diseases and those of lesser importance. Recommendations for treatment will be made when necessary.

Infestations above described will be treated through logging operations, whenever feasible, using silvicultural and entomological treatments necessary on each area.

Direct control may be necessary when logging is not feasible.

(3). Program

Current sales of all sizes will be planned to effect control activities in infected or infested areas.

Prompt action on the pine butterfly and spruce budworm infestations has resulted in a reduction of these defoliators to the point where little damage is being done. The remaining small area of spruce budworm infestation on the forest will be sprayed this year (1956).

Initiation by Forest Insect Research of an annual aerial reconnaissance detection program has aided greatly in the detection and suppression of the most serious outbreaks. It will be the policy for each forest officer to work closely with these men on detection and suppression work and to see that prompt action is taken to (1) control the epidemic through logging or (2) request immediate artificial control action through the forest supervisor.

e. Fire Control

(1) Annual Losses

The table on the following page shows the number of fires by causes, classes, and acreage which have occurred in the last five-year period.

The forest maintains a standard fire plan. It is strengthened with supplemental protection, detection, and suppression forces, tightening up of restrictions on cutting areas, and placing certain men and equipment on standby status during emergencies. Normally the most economical means of slash disposal will involve some expenditure of cooperative slash disposal funds for supplemental protection for a period long enough to reduce the slash hazard to the point where the regular fire organization can maintain the same standards of fire protection as in effect prior to cutting. Every year the rangers, timber staff assistant and fire staff assistant will review the fire action and placement of men on timber sales of the previous year and formulate plans for the ensuing year, making such changes as are necessary. Clauses in the timber sale contract will be invoked where necessary. Aggressive effort will be made to assign fire protection responsibilities on active sale areas to operators making certain they are organized and qualified to provide extra prevention measures, special fire patrols, fire reporting and efficient fire suppression action.

Woods and sawmill crews will be given extra fire prevention instructions. Suppression training will be given to these men periodically by the rangers with follow-up training on bad years with a view of maintaining them as effective suppression crews headed by specifically designated overhead. Emphasis should be placed on training equipment crews from these organizations.

Snag falling may be required in sales contracts for areas where existing snags constitute a considerable fire hazard. The decision on whether or not to include snag falling in a contract will be made by the district ranger in consultation with the timber and fire staff officers.

Boise National Forest annual burned area objectives are as follows:

Not more than 24 man caused fires.

Not more than 8 Class C, D, and E fires.

Not more than 2 extra period C, D, and E fires.

Not more than 1/10 of 1% of commercial forest land burned.

Not more than .125 of 1% of all other lands burned.

FIRE OCCURRENCE AND BURNED AREA RECORD
1950 - 1956
Boise National Forest

Year	Man-Caused	Lightning	Total	Class A	Class B	Class C	Class D	Class E	Class Total	Burned Area - Acres: Acres	Other Inside Acres	Total	Commercial Land-Ac.	Non Commercial Land Acres	Total
1950	14	96	110	79	29	2	-	-	110	140	5	145	145	-	145
1951	19	116	135	111	15	6	2	1	135	961	62	1023	623	400	1023
1952	37	96	133	113	18	1	-	1	133	685	111	796	496	300	796
1953	49	129	178	137	34	3	3	1	178	881	90	971	896	75	971
1954	26	116	142	123	16	2	1	-	142	280	19	299	49	250	299
1955	23	75	98	80	15	2	-	1	98	2253	6126	8379	8329	50	8379
Total	168	628	796	643	127	16	6	4	796	5200	6413	11613	10538	1075	11613

(2) Silvicultural Tool

(a) Slash disposal

All main traveled roads along which logging is done will have a protective strip at least 100 feet on each side of the road within which the slash will be disposed of by piling and burning or by any other method which will satisfactorily reduce the hazard. Roads which are put to bed, but which may be traveled by fishermen, hunters, and others, shall have slash disposed of in a strip at least 50 feet on each side. Heavy concentrations of slash on level areas or gentle slopes and other areas where there is an excess of slash not needed for erosion control purposes will receive similar treatment. Planned fire breaks shall have the slash piled and burned or disposed of by other methods. Slash on areas not listed above shall be disposed of by lopping and scattering.

Fire measures to meet new objectives and to take advantage of new methods discovered by research or experience will be applied currently.

Specific requirements for slash disposal in the various timber types are covered in the Forest Service Manual, Volume 3, Title 7, Section 102.12 to 102.15 inclusive, and R-4 amendments. Prescriptions for slash disposal plans are also included. Each forest officer will be expected to familiarize himself with

the standard slash disposal policies as contained therein and to apply them where applicable in the areas under his jurisdiction.

(b) Other

Scarcity of ground cover and erodible slopes make fire undesirable as a silvicultural tool, except possibly in regeneration of lodgepole pine. Slash from diseased or insect infested trees should be burned when necessary to prevent spread to the residual stand.

f. Acquisition

(1) Purchase

The Boise National Forest comprises parts of five counties as follows: Ada, Boise, Elmore, Gem, and Valley. The gross acreage of the forest according to the June 30, 1954, national forest pamphlet is 2,950,613 acres; owned by the United States, 2,630,388 acres, in process of acquisition, 1,824 acres or a total of 2,632,212 acres. The remainder, or 318,401 acres is private, state and Bureau of Land Management lands.

The Arrow Rock Purchase Unit comprises parts of the Pine, Cottonwood, and Idaho City Districts totaling 726,970 gross acres. To date 35,091 acres have been purchased in the unit.

Of the 318,401 gross acres within the forest in other ownership, it is estimated 105,399 acres are

non-purchasable being in private ownership and 85,072 acres of state lands which for legislative reasons are also non-purchasable, or a total of 190,471 acres classified as non-purchasable according to the forest's Land Acquisition Plan made in 1952.

The remaining 127,930 acres are classified as purchasable. Forest Service policy on acquisition by purchase is outlined in the Chief's letter of July 26, 1954, circular L-425. Proposals for land acquisition by purchase must meet at least one of these requirements:

> The land is required for rights-of-way or other means of making public resources available for public use (e.g., timber access roads and access to public hunting and fishing areas).
>
> The land obtained by the Federal Government is to be used for research or for demonstration of forest management, or similar purposes.
>
> The land obtained requires national forest status to prevent damage to adjoining national forest and private land, such as through excessive erosion or excessive fire hazard.
>
> Small intermingled or adjacent tracts which should be obtained to avoid excessive Federal expenditures for protection of adjoining national-forest land and timber from theft and other trespass.
>
> Relatively small intermingled or adjacent tracts required to supplement the protection of special and specific recreational, community-watershed, or similar public values.
>
> Small administrative sites required for administration of Forest Service activities.
>
> Small intermingled tracts, the acquisition of which will permit economies in public services (e.g., where county governments are trying to avoid construction and maintenance of roads, schools, etc., for isolated settlers).

Acquisitions under special congressional directives (International Wilderness Area in Minnesota).

(2) Exchange

In addition to meeting one or more of the above criteria, proposals for exchanges of national-forest timber for private land are to have the prior approval of the Washington Office of the Forest Service before entering the negotiation stage. Each case will be considered on its merits, but generally speaking, the policy is not to acquire land by this means.

There are some pending cases which have been in process for a considerable period that may not meet these qualifications. Since the rejection of some of these may be unfair to the proponent, these cases will be considered on their individual merits.

Land-for-land exchanges will continue to be authorized to consolidate public and private holdings, to consolidate Federal and State holdings, to permit urban and industrial development, and to permit similar adjustments in ownership clearly in the public interest.

Some transfers of land already in federal ownership to national forest jurisdiction may be desirable, and transfers from national forest to other Federal jurisdiction also may occur.

9. Cooperation

a. With Other Federal Agencies

Cooperation with the Bureau of Land Management in access road planning and construction and in insect control and disease for the benefit of each agency. Timber sale activity of the various bureaus should be coordinated as closely as possible to eliminate leaving behind small patches of uncut timber which would necessitate unreasonable logging costs.

b. State Agencies

Cooperation with the State in access road construction, insect and disease control and timber sale activities.

c. Private Owners

Cooperation insofar as possible under law with private owners in insect and disease control and fire control.

SUPPORTING DATA

1. History

The first white man probably traversed the Boise National Forest in 1800 in quest of furs. Gold was discovered by Captain John Grimes and party in Boise Basin. Between 1800 and 1862 few whites visited in or lived in the area. Those who did probably conducted a flourishing fur trade with the Indians.

After the gold discovery thousands of prospectors, miners, and fortune hunters who came to the Basin began to set up camps and the villages of Idaho City, Pioneerville, Centerville and Quartsburg came into existence. Idaho City, during the period from 1865 to 1888, had 4,800 people. From the Basin venturesome souls spread out to surrounding areas and the mining villages of Atlanta, Rocky Bar and Featherville came into existence between 1862 and 1865 on the South Fork of the Boise River. Whip sawed lumber was used to build rockers and sluice boxes and this is the first recorded instance of the lumber industry in Boise Basin and the Boise National Forest.

Apparently from the known history of the Boise Forest, a sawmill operated by water power was started in the Basin on Grimes Creek in 1862-63; also in 1863 a steam sawmill was constructed and operated at Idaho City. A mill was operating near Centerville in 1863 and a steam sawmill also operated near Placerville in 1863.

These early mills sawed rough lumber for the miners and merchants for construction purposes and hauled the rest to Boise.

The merchants who set themselves up brought in provisions, tools,

clothing and liquor by pack trains. Many of those disappointed in the gold rush left the Basin and returned to their homes or drifted to the Boise and Payette River valley plains and began to settle and engage in agricultural pursuits, which proved more lucrative than mining as the mines paid high prices for fresh produce. Boise County was one of the first seven counties created by the First Territorial Legislature in 1864 and also the last county in the State to have a railroad.

A forest nursery was established across the road from the present Long Gulch Guard Station in 1906 but was abandoned in a year or two.

The railroad which traverses the forest from Banks to Smiths Ferry was built in the years 1909-1914. Between 1914-1935 a logging railroad connected Boise and Idaho City.

The first timber survey of any record was made in 1908 for a tie, mining timber and post sale in Section 6 and 7, Township 8N., Range 5E. As far as can be determined this sale was not made.

From past history insect infestations hit the forest in 1893 with pine butterfly covering an area from Squaw Creek Hill to Payette Lakes. In 1898, 1903-1904, 1907, 1920-1922, and 1923-1924 it was reported that pine butterfly covered southern Idaho.

The first recorded instance of western pine beetle occurred in 1907, then again in 1909, 1912-1914 mostly in the Bear Valley area. In 1918 the western pine beetle (Dendroctonus brevicomis) occurred in the Squaw Creek area. In 1923 the mountain pine beetle caused considerable damage in the Middle Fork of the Payette River and the western pine beetle damaged stands in the South Fork of the Salmon River. A spruce budworm outbreak occurred during 1923 over the

forest in stands of Douglas fir, white and alpine fir and larch. From 1924-1933 practically all the lodgepole stands north of the South Fork of the Payette River had been attacked in epidemic proportions with western pine beetle. By 1935 it had subsided.

In 1939 the western pine beetle appeared to be increasing in the Squaw Creek watershed and the Douglas fir beetle showed signs of building up in Douglas fir stands over the forest. In 1950-51 an area in Wilson and Warm Springs Creek on the Bear Valley District was treated for western and mountain pine beetle. A survey of Douglas fir beetle was made over the forest in 1952 showing extensive damage in Douglas fir stands.

During 1954 an aerial spray job was done on the pine butterfly occurring in epidemic proportions on parts of the Atlanta, Lowman and Bear Valley Districts. In 1955 an aerial spray job was done on spruce budworm over portions of the northern part.

The first seeding with forest tree seeds was done on the following areas:

Carpenter Creek (Experiment #3) - March 3-April 5, 1909. Three acres were sown with 3 lbs. Austrian pine seed and 10 lbs. ponderosa pine sown on bunch grass and brush land under spot method.

Third Fork (Experiment #4) - One acre sown November 10, 1909, snow and spot method. Five pounds yellow pine seed collected on the forest sown on bunch grass and brush land.

Bass Hill (Experiment #5) - Four acres sown April 19, 1910, on old burn with 20 lbs. Douglas fir seed. One acre by spot, 3 acres

broadcast.

Ola (Experiment #6) - Five and one-half acres planted April 13, 1910, four lbs. Austrian pine, 20 lbs. ponderosa pine, 6 lbs. Douglas fir sown on open bunch grass area.

Ola (Experiment #7) - One and one-half acres sown April 25, 1910, on open bunch grass west exposure. Land plowed and harrowed before sowing 5 lbs. Black Locust.

Poorman Creek Nursery (Experiment #8) - One and one-half acres sown April 28, 1910, on land cleared of ponderosa pine. Area plowed and harrowed before sowing. Six and one-half lbs. black locust seed sown in drill five feet apart. Exposure southeast.

Third Fork of Squaw Creek (Experiment #9) - One and three/eights acres sown April 25, 1910, with 8 lbs. black locust on land previously covered with grass and scattered ponderosa pine. South exposure.

Antelope (Experiment #10) - One-quarter acre planted on old burn near Third Fork Guard Station on April 27, 1910. Three lbs. ponderosa pine seed broadcast in brush.

The descriptions of the above areas and results are not recorded. Other seeding experiments were conducted but records were incomplete or lost.

2. Physiography

a. Elevations and Topography

The Boise National Forest is drained by three major tributaries of the Snake River, namely, the Boise, Payette and Salmon Rivers.

The Boise River with its three branches and attendant streams

drains the area which is known as the southern half of the forest. The Payette River with its three branches and attendant streams drains a portion of the northern part of the forest and the Salmon River with its two branches and side streams drains the area around Warm Lake, the Landmark District and the Bear Valley country or that portion not drained by the Payette.

Within each of these drainage units numberous side streams cut up the intervening areas into rough, mountainous topography. Most of the areas supporting commercial timberland are considered loggable.

Elevations within the forest vary from approximately 2800 feet at the forest boundary between Mores Creek junction and Arrow Rock Dam and Mount Cramer (10,720 feet) on the Lowman District.

Commercial timber is found from about 3500 feet to 7500 feet elevation.

b. Soils

The soil over most of the forest is a residual, gravelly, sandy loam which has been derived from the easily disintegrated underlying granite. It is essentially uniform in general character throughout the area but is normally deepest and of finest texture in the bottoms and on the benches and gentle lower slopes, becoming shallow and very gravelly on steep slopes and ridge tops. It is highly permeable to water and low in moisture holding capacity under normal conditions. The litter cover on the whole is light, varying in depth from practically zero on some south-facing slopes to two inches or more on some of the north-facing,

more heavily-vegetated slopes. The soil is of good quality and varies in depth from 4 inches to 6 feet. The average is probably 18-24 inches.

On the Squaw Creek watershed the soil is shallow and of volcanic ash, black loam and adobe clay, very tenacious when wet and very hard when dry.

Igneous rock is widespread over the southern portion of the forest and is a heavy basic rock. It is dark brown to black in color with very little crystallization. The soil which comes from the weathering of this rock is a compact, silty loam, light brown in color and contains very little organic matter after a 6-inch depth is reached. The average depth for these volcanic soils is probably 6 to 18 inches.

c. Climate

The precipitation on the forest varies from about 15 inches at the lower elevations to 40 inches at the higher elevations. Probably over the forest as a whole 25-30 inches is an average. Most of it occurs in the form of snow which falls to the depth of 2 to 12 feet each winter, according to the altitude. The months of July, August and September are usually void of precipitation. During these months the weather is usually dry, lightning storms occur and the forest fire hazard often becomes extreme.

As a general rule snow is gone by July 1, except on some of the higher peaks. The north slopes are covered for a longer period with greater depths of snow than the south slopes.

The average annual range in temperature is from -40° F. to +103° F. with a mean of 18° for the winter and 60° for the summer. High summer temperatures are usually accompanied with low humidities.

Wind velocities are moderate at the lower elevations since the various drainages tend to funnel the winds from the Snake River plain into the forest.

3. Economy

a. Population by Communities

Within the exterior boundaries are the small communities of: Idaho City, Pioneerville, Placerville, New Centerville, Old Centerville, Prairie, Pine, Featherville, Rocky Bar, Atlanta, Lowman, Banks, and Stibnite.

The above probably have a total population of less than 400 people at the present time.

The communities which are more or less dependent on the Boise National Forest for their timber supply and population by the 1950 census are:

Emmett	3,067
Horseshoe Bend	401
Cascade	943
McCall	1,173

Those communities which are not entirely dependent due to other industries such as farming, livestock raising, mining, and other manufacturing or processing industries with their populations by the 1950 census are:

Boise	34,393
Mountain Home	1,887
Idaho City	246
Meridian	1,810
Fairfield	502
Caldwell	2,480
Stibnite	717
Nampa	7,000
Garden Valley-Crouch	410
Ola	

A large proportion of the labor forces of the communities listed, when not working in agricultural pursuits or its related industries, are employed by the lumber industry.

b. Industries

(1) Forest

Sawmills have been active in or near the forest since the early days of Idaho City in 1863.

The annual sawmill report for the Boise National Forest for 1954 shows there are 24 active sawmills which are adjacent to or on the forest and draw from it for their cut. Besides these mills there are 13 inactive mills which would utilize timber from the forest.

There is a mill capacity of over 200 million feet on or adjacent to the forest. This capacity could be increased by several of the larger mills and would take care of the increase in timber harvest if it became necessary. The present capacity of the mills is more than enough to take care of the annual cut set up in the plan at this time.

There are two reports concerning the lumber industry in southwest Idaho pertaining to the above. One is the

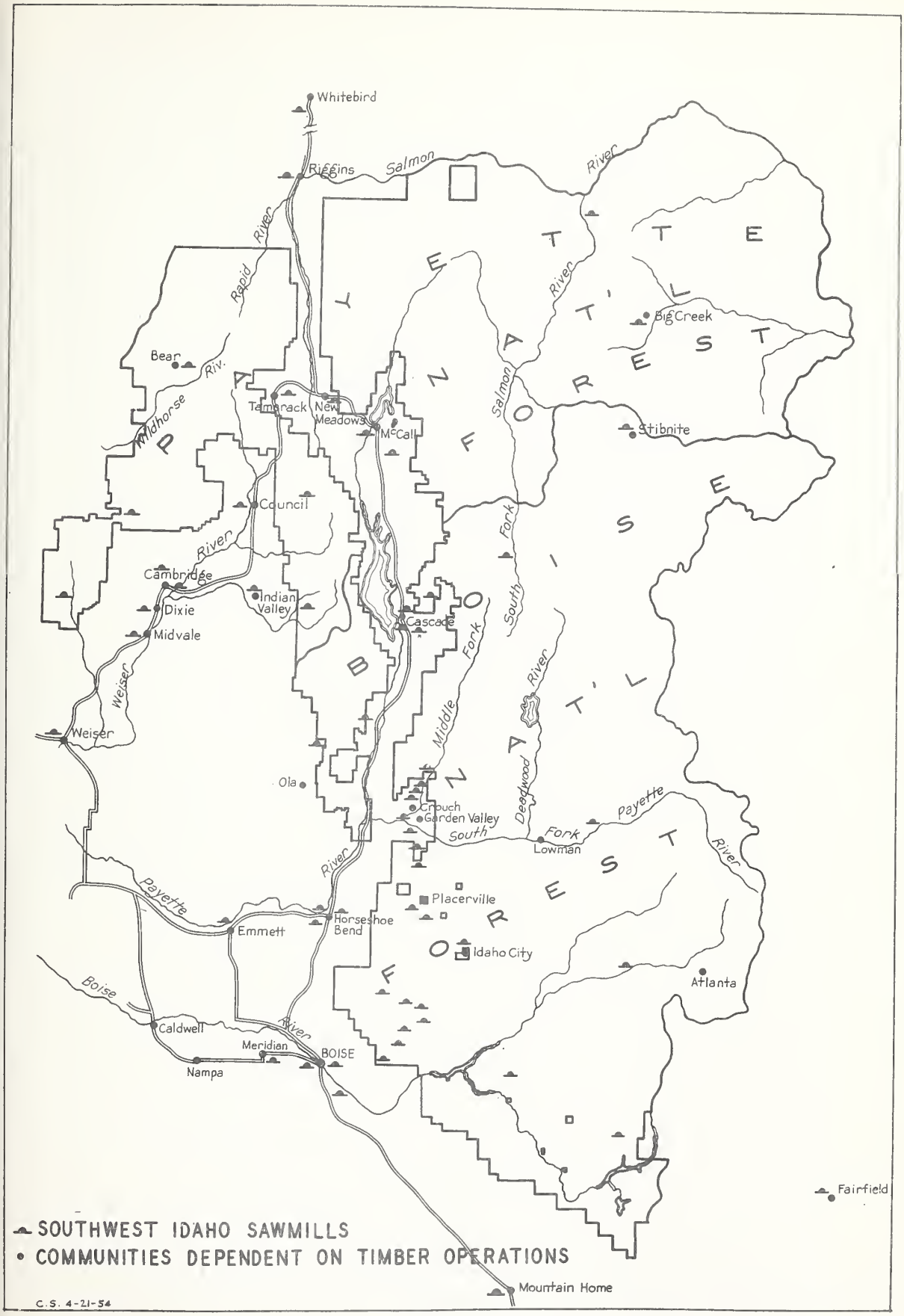
report on the "Outside Situation" by the Southwest Idaho Timber Management Study and the other is "Timber Access Road Program, Boise and Payette National Forests, Idaho," written by the R-4 Divisions of Engineering and Timber Management.

Studies are being initiated concerning the possibilities for a pulp using industry utilizing pulpwood species from the Boise and Payette National Forests.

(2) Other

Adjacent to the forest front on the south and from Mountain Home to Banks the most important industry is agricultural. The Boise River Valley with its irrigated lands and the irrigated lands of the Snake River plain near Mountain Home create a strong local market for timber products which come from the forest.

Within and adjacent to the territory surrounding the City of Boise are many and varied small manufacturing facilities, exclusive of wood using industries. Boise acts as a distribution point for the area between Salt Lake City and Portland.


Whitebird
Riggins
Salmon River
Rapid River
Bear
Riv.
Tamarack
New Meadows
McCall
Salmon River
Big Creek
Stibnite
Council
Cambridge
Indian Valley
Dixie
Midvale
Weiser River
Weiser
Cascade
South Fork
Middle Fork
Deadwood River
Ola
Crouch
Garden Valley
South Fork Payette River
Lowman
Payette River
Placerville
Horseshoe Bend
Emmett
Idaho City
Atlanta
Boise River
Caldwell
Meridian
BOISE
Nampa
Fairfield
Mountain Home
SOUTHWEST IDAHO SAWMILLS
COMMUNITIES DEPENDENT ON TIMBER OPERATIONS
C.S. 4-21-54

APPENDIX

4. a. Detailed Timber Data

The following tables show net volume for each of the ten blocks within the working circle.

Immediately after the block summaries are tables taken from the report on the Southwest Idaho Timber Management Study. The tables show type areas and volume summaries for all classes of ownership for the working circle. Volume data is gross and has been corrected to net volume for use in regulation calculations.

Also included in basic data covering the Idaho Primitive area and Sawtooth Wilderness Area, or the inactive portion of the working circle.

More detailed maps, type area and volume data by township for all classes of ownership are in the forest supervisor's office for the working circle. Each forest ranger has this same detailed information for his blocks.

BOISE WORKING CIRCLE
NATIONAL FOREST AREA AND VOLUME SUMMARY

Type	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total	Volume LP Poles M Cu.Ft.
PP large sawtimber	399,605	3,845	1,453	152	18	25	18	5,511	11,588
DF large sawtimber	206,854	172	1,977	20	86	148	39	2,442	8,888
WF large sawtimber	4,660	36	22	75	-	-	-	133	-
ES large sawtimber	21,726	-	11	-	178	27	33	249	-
AF large sawtimber	5,051	-	3	-	20	32	3	58	343
Total large	637,896	4,053	3,466	247	302	232	93	8,393	20,819
PP small sawtimber	11,568	66	24	-	-	-	-	90	787
DF small sawtimber	156,429	64	951	24	47	71	29	1,186	17,520
WF small sawtimber	1,799	2	13	23	-	2	-	40	-
ES small sawtimber	23,792	-	3	-	177	53	24	257	3,997
AF small sawtimber	58,550	-	50	3	18	173	45	289	3,747
LP small sawtimber	60,062	1	12	3	21	18	134	189	19,040
Total small	312,200	133	1,053	53	263	317	232	2,051	45,091
PP Cutover	117,380	682	274	7	-	2	7	972	-
DF Cutover	17,255	17	97	-	-	2	-	116	-
WF Cutover	6,387	4	15	45	-	-	2	66	-
ES Cutover	491	-	-	-	4	-	2	6	-
AF Cutover	260	-	-	-	-	1	-	1	-
LP Cutover	1,603	-	-	-	-	-	6	6	608
Total cutover	143,376	703	386	52	4	5	17	1,167	608
PP poles & saplings	13,281	12	5	-	-	-	-	17	-
DF poles & saplings	45,329	-	20	-	-	1	1	22	-
WF poles & saplings	382	-	-	-	-	-	-	-	-
ES poles & saplings	60	-	-	-	-	-	-	-	-
AF poles & saplings	5,539	-	1	-	1	6	1	9	831
LP poles & saplings	101,673	3	31	-	14	11	61	120	47,786
Total poles & saplings	166,264	15	57	-	15	18	63	168	48,617
Sub-Total	1,259,736	4,904	4,962	352	584	572	405	11,779	
Deforested	92,450								
Total Commercial Forest	1,352,186	4,904	4,962	352	584	572	405	11,779	115,135

NATIONAL FOREST LAND
MOUNTAIN HOME BLOCK (D-1)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	32,625	358	116			2	2	478
P9A	1,401	9	4					13
P Cutover	4,104	28	9					37
P P&S	934	1						1
Total P	39,064	396	129			2	2	529
D9B	13,497	7	133		2	7	2	151
D9A	9,043	5	70			4	1	80
D Cutover	355		2					2
D P&S	11,753		6			1		7
Total D	34,648	12	211		2	12	3	240
S9B	154				3	1		4
S9A	95	-			2			2
Total S	249				5	1		6
AF9B	28							
AF9A	1,625		4			9	3	16
AF P&S	30							
Total AF	1,683		4			9	3	16
LP9A	554				1	1	2	4
LP P&S	889		1				1	2
Total LP	1,443		1		1	1	3	6
Sub-Total	77,087	408	345	-	8	25	11	797
Deforested	6,605							
Total Commercial Loggable	83,692							

NATIONAL FOREST LAND
COTTONWOOD BLOCK (D-2)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	27,379	230	81			2	1	314
P9A	1,280	6	1					7
P Cutover	10,913	63	19			1	2	85
P P&S	882	1						1
Total P	40,454	300	101			3	3	407
D9B	11,648	5	113		1	6	1	126
D9A	9,510	5	65			5	1	76
D Cutover	133							
D P&S	5,161		4					4
Total D	26,452	10	182		1	11	2	206
AF9A	1,656		5			10	3	18
Total AF	1,656		5			10	3	18
LP9A	433				1	1	2	4
LP P&S	644						1	1
Total LP	1,077				1	1	3	5
Sub-Total	69,639	310	288	-	2	25	11	636
Deforested	3,382							
Total	73,021							

NATIONAL FOREST LAND
IDAHO CITY BLOCK (D-3)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	24,822	224	79	2		1	1	307
P9A	1,954	10	3					13
P Cutover	46,927	272	104			1	3	380
P P&S	6,100	7	1					8
Total P	79,803	513	187	2		2	4	708
D9B	16,498	8	141		2	8	2	161
D9A	7,320	3	37			3	1	44
D Cutover	4,175	3	22			1		26
D P&S	4,232		2					2
Total D	32,225	14	202		2	12	3	233
S9A	10							
S Cutover	140				1			1
Total S	150				1			1
AF9B	447		1			2		3
AF9A	1,112		2			6	2	10
AF Cutover	230					1		1
AF P&S	210							
Total AF	1,999		3			9	2	14
LP9A	60							
LP Cutover	260						1	1
LP P&S	1,045		1				1	2
Total LP	1,365		1				2	3
Sub-Total	115,542	527	393	2	3	23	11	959
Deforested	27,605							
Total	143,147							

NATIONAL FOREST LAND
ATLANTA BLOCK (D-4)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	29,132	276	94			1	1	372
P9A	992	6	3					9
P Cutover	5,565	41	14					55
P P&S	278							
Total P	35,967	323	111			1	1	436
D9B	26,829	14	273		5	16	3	311
D9A	24,530	15	195			11	4	225
D Cutover	4,941	3	26			1		30
D P&S	7,072		4					4
Total D	63,372	32	498		5	28	7	570
SP9B	145				2	1		3
Total S	145				2	1		3
AF9B	519		1			5	3	9
AF9A	3,259		10			20	6	36
AF Cutover	30							
AF P&S	336							
Total AF	4,144		11			25	9	45
LP9A	1,992		2		5	4	8	19
LP Cutover	164						1	1
LP P&S	2,423		2				2	4
Total LP	4,579		4		5	4	11	24
Sub-Total	108,207	355	624	-	12	59	28	1,078
Deforested	2,346							
Total	110,553							

NATIONAL FOREST LAND
LOWMAN BLOCK (D-5)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	94,679	1,020	353	25	4	6	5	1,413
P9A	909	6	4					10
P Cutover	6,542	45	13				1	59
P P&S	315							
Total P	102,445	1,071	370	25	4	6	6	1,482
D9B	34,452	28	324	3	15	25	7	402
D9A	25,683	9	139	2	5	12	4	171
D Cutover	2,159	1	9					10
D P&S	7,171		2					2
Total D	69,465	38	474	5	20	37	11	585
S9B	1,161				9	1	2	12
S9A	679				6	2	1	9
Total S	1,840				15	3	3	21
AF9B	290				2	2		4
AF9A	3,754		4		2	13	3	22
AF P&S	663					1		1
Total AF	4,707		4		4	16	3	27
LP9A	5,645	1	2	1	3	2	15	24
LP Cutover	121							
LP P&S	9,634		4		2	1	6	13
Total LP	15,400	1	6	1	5	3	21	37
Sub-Total	193,857	1,110	854	31	48	65	44	2,152
Deforested	6,574							
Total	200,431							

NATIONAL FOREST LAND
EMMETT BLOCK (D-6)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	37,934	327	129	21	2	2	1	482
P9A	1,555	9	2					11
P Cutover	7,502	42	17	2				61
P P&S	3,026	2	2	—	—	—	—	4
Total P	50,017	380	150	23	2	2	1	558
D9B	7,983	7	82	2	4	7	2	104
D9A	5,829	3	30	2	4	3	1	43
D Cutover	2,568	4	13					17
D P&S	991	—	—	—	—	—	—	—
Total D	17,371	14	125	4	8	10	3	164
S9B	118				1			1
S9A	1,652				12	2	2	16
S Cutover	351				3		2	5
S P&S	10				—	—	—	—
Total S	2,131				16	2	4	22
AF9A	1,296		1			3	1	5
AF P&S	130		—			—	—	—
Total AF	1,426		1			3	1	5
WF9B	3,643	28	18	56				102
WF9A	1,719	2	12	22		2		38
WF Cutover	3,731	2	8	29			2	41
WF P&S	379	—	—	—		—	—	—
Total WF	9,472	32	38	107		2	2	181
LP9A	681						2	2
LP Cutover	998						4	4
LP P&S	2,388		1				2	3
Total LP	4,067		1				8	9
Sub-Total	84,484	426	315	134	26	19	19	939
Deforested	7,263							
Total	91,747							

NATIONAL FOREST LAND
GARDEN VALLEY BLOCK (D-7)
TYPE AREA AND VOLUME SUMMARY

		Net Volume Million Board Feet						
	Acres	PP	DF	WF	ES	AF	LP	Total
P9B	89,719	875	365	53	8	8	3	1,312
P9A	2,392	12	5					17
P Cutover	16,441	92	48					140
P P&S	1,373	1	2					3
Total P	109,925	980	420	53	8	8	3	1,472
D9B	10,819	11	117	1	7	11	2	149
D9A	8,267	2	54	2	3	4	2	67
D Cutover	536	1	3					4
D P&S	5,641		1				1	2
Total D	25,263	14	175	3	10	15	5	222
S9B	163				2			2
S9A	110				1			1
Total S	273				3			3
AF9B	80				1	1		2
AF9A	139							
Total AF	219				1	1		2
WF9B	937	7	4	18				29
WF9A	80		1	1				2
WF Cutover	307	1	1	3				5
WF P&S	3							
Total WF	1,327	8	6	22				36
LP9A	464						1	1
LP P&S	657							
Total LP	1,121						1	1
Sub-Total	138,128	1,002	601	78	22	24	9	1,736
Deforested	25,227							
Total	163,355							

NATIONAL FOREST LAND
BEAR VALLEY BLOCK (D-8)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	17,382	149	58	10	1	1	1	220
P9A	280	2						2
P Cutover	20							
P P&S	60							
Total P	17,742	151	58	10	1	1	1	222
D9B	40,705	44	363	7	26	34	10	484
D9A	17,298	3	101	4	6	7	4	125
D P&S	1,013							
Total D	59,016	47	464	11	32	41	14	609
S9B	5,903				53	6	11	70
S9A	4,662		1		37	12	5	55
Total S	10,565		1		90	18	16	125
AF9B	912				4	6		10
AF9A	11,689		5		6	34	9	54
AF P&S	818					1		1
Total AF	13,419		5		10	41	9	65
LP9A	39,398		6	2	9	7	81	105
LP Cutover	60							
LP P&S	38,566		11		6	5	23	45
Total LP	78,024		17	2	15	12	104	150
Sub-Total	178,766	198	545	23	148	113	144	1,171
Deforested	4,301							
Total	183,067							

NATIONAL FOREST LAND
CASCADE BLOCK (D-9)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	41,020	346	163	39	3	2	3	556
P9A	805	6	2					8
P Cutover	19,336	99	50	5			1	155
P P&S	313	—	—	—	—	—	—	—
Total P	61,474	451	215	44	3	2	4	719
D9B	24,225	26	253	4	11	17	5	316
D9A	29,426	16	149	10	20	15	7	217
D Cutover	2,388	5	22					27
D P&S	1,925	—	1	—	—	—	—	1
Total D	57,964	47	425	14	31	32	12	561
S9B	1,442		1		11	2	2	16
S9A	6,610		1		48	14	7	70
Total S	8,052		2		59	16	9	86
AF9B	440				1	2		3
AF9A	11,817		6	1	3	28	5	43
AF P&S	334		—	—	—	—	—	—
Total AF	12,591		6	1	4	30	5	46
WF9B	80	1		1				2
WF Cutover	2,349	1	6	13				20
Total WF	2,429	2	6	14				22
LP9A	7,098		1		2	2	16	21
LP P&S	21,483	3	6		3	3	14	29
Total LP	28,581	3	7		5	5	30	50
Sub-Total	171,091	503	661	73	102	85	60	1,484
Deforested	6,099							
Total	177,190							

NATIONAL FOREST LAND
LANDMARK BLOCK (D-10)
TYPE AREA AND VOLUME SUMMARY

	Acres	Net Volume Million Board Feet PP	DF	WF	ES	AF	LP	Total
P9B	4,913	40	15	2				57
P Cutover	30	—	—	—				—
Total P	4,943	40	15	2				57
D9B	20,198	22	178	3	13	17	5	238
D9A	19,523	3	111	4	9	7	4	138
D P&S	370	—	—	—	—	—	—	—
Total D	40,091	25	289	7	22	24	9	376
S9B	12,640		10		97	16	18	141
S9A	9,974		1		71	23	9	104
S P&S	50		—		—	—	—	—
Total S	22,664		11		168	39	27	245
AF9B	2,335		1		12	14		27
AF9A	22,203		13	2	7	50	13	85
AF P&S	3,018		1	—	1	4	1	7
Total AF	27,556		15	2	20	68	14	119
LP9A	3,737		1			1	7	9
LP P&S	23,944		5		3	2	11	21
Total LP	27,681		6		3	3	18	30
Sub-Total	122,935	65	336	11	213	134	68	827
Deforested	3,048							
Total	125,983							

SOUTHWEST IDAHO TIMBER MANAGEMENT STUDY

TYPE AREA AND VOLUME SUMMARY
By
NATIONAL FORESTS AND ADJACENT AREAS

BOISE NATIONAL FOREST AND ADJACENT AREAS 1951-52

TYPE	AREA, M ACRES L	AREA, M ACRES NL	Gross Volume MM ft. b.m. Scribner: PP L	PP NL	DF L	DF NL	WL L	WL NL	WF L	WF NL	ES L	ES NL	AF L	AF NL	LP L	LP NL	WLP L	WLP NL	TOTAL L	TOTAL NL
TABLE I - NATIONAL FOREST (Exclusive of any Wilderness or Reserved Area)																				
Ponderosa Pine	411	33	4121	233	1637	94	3	-	177	9	21	1	27	2	20	1	-	-	6006	340
Douglas Fir	363	180	246	121	3243	1054	6	1	53	30	147	76	243	105	75	40	19	19	4032	1896
Western Larch	1	-	-	-	3	-	2	-	-	-	1	-	-	-	-	-	-	-	6	-
White Fir	6	-	39	-	39	-	-	-	116	-	1	-	2	-	-	-	-	-	197	-
Engelmann Spruce	46	8	-	-	17	1	-	-	-	-	393	58	86	13	65	10	1	-	562	82
Alpine Fir	63	45	-	-	59	31	-	-	4	4	44	32	228	132	51	27	3	2	389	228
Lodgepole Pine	60	7	2	-	14	2	-	-	3	-	24	2	22	3	142	15	1	-	208	22
Total Sawtimber	950	273	4408	354	5012	1632	11	1	353	43	631	169	608	255	353	93	24	21	11400	2568
PP Cutover	117	-	715	-	304	-	1	-	8	-	1	-	3	-	7	-	-	-	1039	-
DF Cutover	17	-	18	-	108	-	-	-	1	-	-	-	3	-	1	-	-	-	131	-
WF Cutover	6	-	5	-	17	-	-	-	54	-	-	-	-	-	1	-	-	-	77	-
ES Cutover	1	-	-	-	-	-	-	-	-	-	4	-	1	-	2	-	-	-	7	-
LP Cutover	2	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	6	-
Total Cutover	143	-	738	-	429	-	1	-	63	-	5	-	7	-	17	-	-	-	1260	-
Poles	140	28	16	2	64	10	-	-	1	-	17	4	23	17	67	11	1	-	189	44
Seedlings & Saplings	27	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deforested Comm. For.	93	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non Sawtimber	260	71	16	2	64	10	-	-	1	-	17	4	23	17	67	11	1	-	189	44
Total Comm. Forest	1353	344	5162	356	5505	1642	12	1	417	43	653	173	638	272	437	104	25	21	12849	2612
Total Non Comm. For.	172	30																		
Total Non Forest	357	6																		
TOTAL BOISE FOREST	1882	380	5162	356	5505	1642	12	1	417	43	653	173	638	272	437	104	25	21	12849	2612

SOUTHWEST IDAHO TIMBER MANAGEMENT STUDY

TYPE AREA AND VOLUME SUMMARY
By
NATIONAL FORESTS AND ADJACENT AREAS

BOISE NATIONAL FOREST AND ADJACENT AREAS — 1951-52

Gross Volume MM ft. b.m. Scribner

TYPE	AREA, M ACRES		PP		DF		WL		WF		ES		AF		LP		MLP		TOTAL	
	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL
TABLE II - STATE OF IDAHO																				
Ponderosa Pine	16	1	133	4	52	2	-	-	6	-	1	-	1	-	1	-	-	-	194	6
Douglas Fir	10	1	8	-	90	7	-	-	2	-	5	-	7	-	2	-	1	-	115	7
White Fir	1	-	9	-	7	-	-	-	17	-	-	-	-	-	-	-	-	-	33	-
Engelmann Spruce	1	-	-	-	-	-	-	-	-	-	7	2	2	1	1	-	-	-	10	3
Alpine Fir	1	-	-	-	1	-	-	-	-	-	-	-	2	1	1	-	-	-	4	1
Lodgepole Pine	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
Total Sawtimber	30	2	150	4	150	9	-	-	25	-	13	2	12	2	6	-	1	-	357	17
PP Cutover	37	-	137	-	60	-	1	-	2	-	-	-	1	-	2	-	-	-	203	-
DF Cutover	2	-	2	-	14	-	-	-	1	-	-	-	-	-	-	-	-	-	17	-
WF Cutover	3	-	4	-	7	-	-	-	18	-	-	-	-	-	-	-	-	-	29	-
LP Cutover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
Total Cutover	42	-	143	-	81	-	1	-	21	-	-	-	1	-	3	-	-	-	250	-
Poles	10	-	6	-	4	-	-	-	-	-	-	-	1	-	2	-	-	-	13	-
Seedlings & Saplings	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deforested Comm. For.	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non Sawtimber	25	-	6	-	4	-	-	-	-	-	-	-	1	-	2	-	-	-	13	-
Total Comm. Forest	97	2	299	4	235	9	1	-	46	-	13	2	14	2	11	-	1	-	620	17
Total Non Comm. Forest	3	1																		
Total Non Forest	51	-																		
TOTAL STATE	151	3	299	4	235	9	1	-	46	-	13	2	14	2	11	-	1	-	620	17
TABLE III - PRIVATE																				
Ponderosa Pine	28	-	227	-	94	-	-	-	16	-	1	-	1	-	2	-	-	-	342	-
Douglas Fir	11	-	6	-	85	-	1	-	3	-	5	-	7	-	2	-	-	-	106	-
White Fir	1	-	5	-	4	-	-	-	13	-	-	-	-	-	-	-	-	-	22	-
Spruce	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-
Lodgepole Pine	1	-	-	-	1	-	-	-	-	-	-	-	-	-	9	-	-	-	10	-
Total Sawtimber	41	-	238	-	184	-	1	-	32	-	7	-	8	-	13	-	-	-	483	-
PP Cutover	105	-	387	-	154	-	4	-	16	-	-	-	1	-	6	-	-	-	568	-
DF Cutover	17	-	16	-	99	-	-	-	7	-	1	-	1	-	2	-	-	-	126	-
WF Cutover	10	-	6	-	25	-	1	-	79	-	1	-	-	-	1	-	-	-	113	-
LP Cutover	1	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	5	-
Total Cutover	133	-	409	-	278	-	5	-	102	-	2	-	2	-	14	-	-	-	812	-
Poles	15	-	8	-	6	-	-	-	-	-	-	-	1	-	5	-	-	-	20	-
Cutover Poles	18	-	19	-	8	-	-	-	-	-	-	-	-	-	1	-	-	-	28	-
Seedlings & Saplings	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deforested Comm. Forest	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non Sawtimber	67	-	27	-	14	-	-	-	-	-	-	-	1	-	6	-	-	-	48	-
Total Comm. Forest	241	-	674	-	476	-	6	-	134	-	9	-	11	-	33	-	-	-	1343	-
Total Non Comm. For.	2	-																		
Total Non Forest	259	-																		
TOTAL PRIVATE	502	-	674	-	476	-	6	-	134	-	9	-	11	-	33	-	-	-	1343	-

SOUTHWEST IDAHO TIMBER MANAGEMENT STUDY

TYPE AREA AND VOLUME SUMMARY
By
NATIONAL FORESTS AND ADJACENT AREAS

BOISE NATIONAL FOREST AND ADJACENT AREAS — 1951-52

Gross Volume MM ft. b.m. Scribner

TYPE	AREA, M ACRES		PP		DF		WL		WF		ES		AF		LP		WLP		TOTAL	
	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL
TABLE IV - OTHER FEDERAL																				
Ponderosa Pine	7	-	69	-	28	-	-	-	4	-	-	-	-	-	-	-	-	-	101	-
Douglas Fir	2	-	2	-	16	-	-	-	-	-	1	-	2	-	-	-	-	-	21	-
Total Sawtimber	9	-	71	-	44	-	-	-	4	-	1	-	2	-	-	-	-	-	122	-
PP Cutover	3	-	14	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-
Total Cutover	3	-	14	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-
Poles	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Total 6	5	-																		
Total Non Sawtimber	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Total Comm. Forest	18	-	86	-	52	-	-	-	4	-	1	-	2	-	-	-	-	-	145	-
Total Non Forest	52	-																		
TOTAL OTHER FEDERAL	70	-	86	-	52	-	-	-	4	-	1	-	2	-	-	-	-	-	145	-
TABLE V - OTHER OUTSIDE (Area of Unclassified Ownership South of Boise Forest)																				
Ponderosa Pine	1	-	6	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-
Douglas Fir	3	-	2	-	20	-	-	-	-	-	-	-	1	-	-	-	-	-	23	-
Total Sawtimber	4	-	8	-	22	-	-	-	-	-	-	-	1	-	-	-	-	-	31	-
PP Cutover	2	-	9	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-
Total Cutover	2	-	9	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-
Poles	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Seedlings & Saplings	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total 6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non Sawtimber	4	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Total Comm. Forest	10	-	19	-	25	-	-	-	-	-	-	-	1	-	-	-	-	-	45	-
Total Non Forest	106	-																		
TOTAL OTHER OUTSIDE	116	-	19	-	25	-	-	-	-	-	-	-	1	-	-	-	-	-	45	-

SOUTHWEST IDAHO TIMBER MANAGEMENT STUDY

TYPE AREA AND VOLUME SUMMARY
By
NATIONAL FORESTS AND ADJACENT AREAS

BOISE NATIONAL FOREST AND ADJACENT AREAS — 1951-52

TYPE	AREA, M ACRES		Gross Volume 1M ft. b.m. Scribner																	
			PP		DF		WL		WF		ES		AF		LP		WLP		TOTAL	
	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL
TABLE VI - RESERVED (Sawtooth Wilderness Area - Boise N.F.)																				
Ponderosa Pine	1	1	7	6	2	2	-	-	-	-	-	-	-	-	-	-	-	-	9	-
Douglas Fir	14	10	8	5	106	79	-	-	-	1	4	3	8	5	1	3	-	-	127	96
Alpine Fir	3	3	-	-	4	2	-	-	-	-	1	2	13	13	2	2	1	-	21	19
Lodgepole Pine	1	-	1	-	-	-	-	-	-	-	-	-	2	-	5	-	-	-	8	-
Total Sawtimber	19	14	16	11	112	83	-	-	-	1	5	5	23	18	8	5	1	-	165	123
Total Cutover	1	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
Poles	1	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-
Seedlings & Saplings	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Non Sawtimber	2	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-
Total Comm. Forest	22	14	18	11	114	83	-	-	-	1	5	5	23	18	9	5	1	-	170	123
Total Non Comm. For.	44	19																		
Total Non Forest	27	17																		
TOTAL RESERVED	93	50	18	11	114	83	-	-	-	1	5	5	23	18	9	5	1	-	170	123
TABLE VII - RESERVED (Idaho Wilderness Area - Boise N.F.)																				
Ponderosa Pine	1	9	10	69	6	40	-	-	-	-	1	4	-	-	-	2	-	-	17	115
Douglas Fir	6	66	1	10	70	764	-	-	-	-	2	24	2	35	3	30	-	-	78	863
Engelmann Spruce	5	2	-	-	6	3	-	-	-	-	46	15	16	7	6	2	3	1	77	28
Alpine Fir	2	1	-	-	-	-	-	-	-	-	2	2	8	5	2	1	-	-	12	8
Lodgepole Pine	1	8	-	-	1	5	-	-	-	-	1	6	1	6	5	23	-	-	8	40
Total Sawtimber	15	86	11	79	83	812	-	-	-	-	52	51	27	53	16	58	3	1	192	1054
Poles	4	14	-	-	-	3	-	-	-	-	-	1	-	1	2	9	-	-	2	14
Seedlings & Saplings	2	6	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Deforested Comm. For.	2	8	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Total Non Sawtimber	8	28	-	1	-	4	-	-	-	-	-	2	-	1	2	9	-	-	2	17
Total Comm. Forest	23	114	11	80	83	816	-	-	-	-	52	53	27	54	18	67	3	1	194	1071
Total Non Comm. For.	26	40																		
Total Non Forest	2	18																		
TOTAL RESERVED	51	172	11	80	83	816	-	-	-	-	52	53	27	54	18	67	3	1	194	1071

SOUTHWEST IDAHO TIMBER MANAGEMENT STUDY

TYPE AREA AND VOLUME SUMMARY
By
NATIONAL FORESTS AND ADJACENT AREAS

BOISE NATIONAL FOREST AND ADJACENT AREAS 1951-52

TYPE	AREA, M ACRES		Gross Volume MM ft. b.m. Scribner																	
			PP		DF		WL		WF		ES		AF		LP		MLP		TOTAL	
	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL
TABLE VIII - STATE OF IDAHO (Idaho Wilderness Area)																				
Ponderosa Pine	-	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Douglas Fir	-	1	-	-	-	11	-	-	-	-	-	-	-	1	-	-	-	-	-	12
Total Sawtimber	-	1	-	3	-	12	-	-	-	-	-	-	-	1	-	-	-	-	-	16
Total Non Sawtimber	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Comm. Forest	-	2	-	3	-	12	-	-	-	-	-	-	-	1	-	-	-	-	-	16
Total Non Forest	-	1																		
TOTAL STATE	-	3	-	3	-	12	-	-	-	-	-	-	-	1	-	-	-	-	-	16
TABLE IX - PRIVATE LAND (Idaho Wilderness Area)																				
Total Sawtimber	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2	1
TOTAL PRIVATE	274 Acres		1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2	1
TABLE X - RESERVED (Boise Basin Experimental Forest - Boise N.F.)																				
Ponderosa Pine	3	-	41	-	13		-	-	-	-	-	-	-	-	-	-	-	-	54	-
Douglas Fir	-	-	-	-	2		-	-	-	-	-	-	-	-	-	-	-	-	2	-
Total Sawtimber	3	-	41	-	15		-	-	-	-	-	-	-	-	-	-	-	-	56	-
PP Cutover	2	-	6	-	4		-	-	-	-	-	-	-	-	1	-	-	-	11	-
Total Cutover	2	-	6	-	4		-	-	-	-	-	-	-	-	1	-	-	-	11	-
Total Comm. Forest	5	-	47	-	19		-	-	-	-	-	-	-	-	1	-	-	-	67	-
Total Non Forest	1	-																		
TOTAL RESERVED	6	-	47	-	19		-	-	-	-	-	-	-	-	1	-	-	-	67	-

4. b. Regulation Calculations

Following are the detailed growth computations used in the calculation of the allowable cut for the ponderosa pine type:

Growth Calculations

Timber survey data collected on the Boise National Forest during the summers of 1951 and 1952 indicate current annual growth of 90 to 145 board feet per acre for uncut large sawtimber and small sawtimber varying with units.

These growth data for virgin stands appear to be out of line and can probably be explained by the fact that for this period growth has been accelerated by past heavy mortality thinnings. This may be a temporary matter and its duration may be very short. Therefore, as a safety feature, no growth will be assigned to virgin stands before cutting. (Following these calculations the allowable cut has been computed with growth assigned to virgin stands after intermediate cutting. This appears to be the logical way to compute growth, however, the calculations result in excessive acreage cutover. When a check and adjustment is applied, the allowable cut figures resulting are approximately the same as those computed without assigning growth to virgin stands.) If the resurvey substantiates these figures, an adjustment in the allowable cut will be made.

Mean annual growth for stands after clear cutting is estimated to be 128 board feet per acre per year. This figure is arrived at by calculating mean annual increment for site index 78 from

Meyers' bulletin. This results in 214 average. Site index 78 was computed from data supplied by the Southwest Idaho Study.* It has been assumed that unmanaged wild stands in this area are 60% of normal values. The Forest Survey found this factor to be about right for similar areas and no better data are now available. Sixty per cent is, therefore, assumed for the present. This factor will be checked as local data became available.

214 M.A.I. x 60% = 128 board feet per acre

Plots used by the Southwest Idaho Timber Management Study for the collection of data were established permanently and their data will be checked at regular periods. All findings of volumes, growth, etc., will be incorporated in revisions of this plan at scheduled times for revision.

(1) Virgin Stands

The existing virgin sawtimber stand will be harvested by clearcutting in small groups in 121 years. Since no growth is being allocated to virgin stands, the expected average mean annual growth of 128 bd. ft. per acre per year will occur only after clear cutting. This mean annual growth is not actually attained until 160 years after the new stand is established. The 121-year period for cutting the present virgin stands results in 121 years of growth for the area cut the first year and no period of growth for the area cut the 121st

*By curving height over age for more than 100 randomly-selected sample trees from field plots.

year. The average period is 121/2. At the end of the rotation the 3386 acres cut first will have had 160 years of growth and each year thereafter an equal area will have attained 128 feet of average growth. The effect of this manipulation of the stand on ultimate yield for the purpose of regulation, however, is the production during the 121-year period of

$$\frac{411{,}173 \text{ acres} \times 121 \text{ years} \times 128 \text{ bd. ft.}}{2} = 3{,}184 \text{ MM bd. ft.}$$

For the remainder of the rotation the effect is represented by 411,173 acres x 39 years x 128 bd. ft. = 2,053 MM bd. ft. since the entire 411,173 acres will be producing new timber during the final 39 years of the rotation. The growth to be accounted for from areas now virgin is represented then by the sum of 3,184 MM plus 2,053 MM or 5,237 MM bd. ft.

(2) Cutover Stands

After the 121 years during which existing virgin sawtimber stands will be harvested by clear cutting in small groups, it will be necessary to make harvest cuts in present cutover stands and in the young stands. On the basis of 3,386 acres per year the 117,380 acres of cutover area will furnish cut for 35 years.

117,380 acres ÷ 3,386 acres = 35 years to clear cut in small patches present cutover area

Growth calculation from the 1951-1952 Boise Timber Survey indicates that the present cutover stands now have a current

annual increment of 90 bd. ft. It is conservatively estimated that this rate of growth will not be exceeded during the 121 years that will elapse before harvest cutting of these stands begins.

The virgin stands are scheduled for harvesting by small patch clear cuttings over a 121-year period. During this period growth is calculated on the cutover stands as follows:

117,380 acres x 121 years x 90 bd. ft.
(actual current annual growth) = 1,278 MM bd. ft.

The 117,380 acres of cutover lands are scheduled for harvesting during the next 35 years. The current annual growth rate of 90 bd. ft. per acre will apply during half of this period but the growth rate of 128 bd. ft. per acre can be anticipated after harvest cutting and thus will apply to one-half of the period. Growth during the 35 years, therefore, is calculated:

$$\frac{117{,}380 \text{ acres} \times 35 \text{ years} \times 90 \text{ bd. ft.}}{2} = 185 \text{ MM bd. ft.}$$

Plus

$$\frac{117{,}380 \text{ acres} \times 35 \text{ years} \times 128 \text{ bd. ft.}}{2} = 263 \text{ MM bd. ft.}$$

One hundred twenty-one years for harvesting virgin stands plus 35 years for harvesting cutover stands accounts for 156 years of the rotation. During the remaining four years the growth on the cutover lands is calculated:

117,380 acres x 4 years x 128 bd. ft. = 60 MM bd. ft.

Thus the total calculated growth for the cutover lands is 1,278 MM plus 185 MM plus 263 MM plus 60 which equals 1,786 MM bd. ft.

During the last six years of the rotation the pole and sapling stands will be scheduled for cutting. For these stands the anticipated growth rate throughout the rotation is 128 bd. ft. per acre. The calculation of growth, therefore, is 13,281 acres x 160 years x 128 bd. ft. = 272 MM bd. ft.

In calculating the growth for this 13,281 acres, it is not necessary to use the divisor of 2 because it is assumed that growth rate will be the same as before, during and after harvest cutting.

Summary of Growth Calculations

Condition Class	Area in Acres	Order of Entry & Duration of Harvest Cut	Growth MMBM			
			Before Harvest Cut	During Harvest Cut	After Harvest Cut	Total
Virgin	411,173	121	-	3,184	2,053	5,237
Cutover	117,380	35	1,278	185	323	1,786
Poles & Saplings	13,281	4	265	7	-	272
Total	541,834	160	1,543	3,376	2,376	7,295

This completes the computations of growth used in the calculation of the allowable cut for the ponderosa pine type in the body of the plan, Section D-6, f.

COMPARISON OF CALCULATION OF ALLOWABLE CUT BY LAKEVIEW METHOD

For the purpose of comparison, the regulated cut in ponderosa pine type will be figured by the methods and checks used in the Lakeview plans. This is as follows:

The Austrian formula is used in this procedure:

$$AC = \text{Annual Increment} + \frac{\text{Present merchantable volume} - \text{Desired volume}}{\text{Number of years in adjustment period}}$$

Annual increment is calculated as follows:

$$\frac{\text{Acres of ponderosa pine type}}{\text{Rotation}} = \text{Acres to be cut each year}$$

$$\frac{541{,}834 \text{ acres}}{160 \text{ years}} = 3{,}386 \text{ acres to harvest each year}$$

The balance of the development period is 20 years. During that 20-year period there will be harvest cut (20) (3386) or 67,720 acres. During this period there will be net growth taking place on the areas cut and regenerated. This amounts to $\frac{(128)(20)(67{,}720)}{2} = 86{,}673$ MBM.

For the remainder of the rotation (160 - 20 or 140 years) these stands will continue to grow at the "60% of normal" rate or 128 bd. ft. per acre per year.

$$(128)(140)(67{,}720) = 1{,}213{,}542 \text{ MBM}$$

The entire virgin area will be cut over during the development period. The area of intermediate cut is:

$$411{,}173 - 67{,}720 = 343{,}453 \text{ acres}$$

Net growth at the rate of 90 board feet per acre per year can be expected in the residual following cutting.

$$\frac{343{,}453 \times 90 \times 20}{2} = 309{,}110 \text{ MBM}$$

The next order of cutting is to return to the same area and make a harvest cut of 3,386 acres per year. At this rate the virgin area will last an additional period: $\frac{343,453}{3,386} = 101.4$ years

During the time cutting is being done growth will be taking place in the residual stands and in the regenerated stands. Growth is then:

$$\frac{(343,453)(128 + 90)\ (101.4)}{2} = 3,796,049 \text{ MBM}$$

Additional growth can be expected during the remainder of the rotation: $160 - (20 + 101.4) = 38.6$ years

$$(343,453)(128)(38.6) = 1,696,933 \text{ MBM}$$

This completes the computation of growth expected on the present virgin area during the current rotation for a total of 7,102,307 MBM

The present residual stands = 117,380 acres

Growth during the years that virgin timber is being cut:

$$(117,380)(90)(121.4) = 1,282,494 \text{ MBM}$$

It will take $\frac{117,380}{3,386}$ or 34.7 years to cutover the residual stands.

Growth during the 34.7 years required to cut residual stands:

$$\frac{(117,426)(34.7)\ (90 + 121)}{2} = 443,966 \text{ MBM}$$

Growth during the last 3.9 years of the rotation:

$$(3.9)(128)(117,426) = 58,596 \text{ MBM}$$

This completes the computation of growth expected on the present residual stands during the current rotation for a total of 1,785,056 MBM.

Young growth = 13,281 acres

Growth during the 156.1 years other cutting is being done:

$$(128)\ (156.1)\ (13{,}281) = 265{,}365 \text{ MBM}$$

Growth taking place during the 3.9 years that young growth stands are being cut:

$$(128)\ (3.9)\ (13{,}281) = 6{,}630 \text{ MBM}$$

This completes the computation of growth expected on the present young growth stands during the current rotation for a total of 271,995 MBM

Total growth expected during the rotation:

Acres now virgin	7,102,307 MBM
Acres now residual	1,785,056 MBM
Acres now in young growth	271,995 MBM
	9,159,358 MBM

Annual growth during rotation:

$$\frac{9{,}159{,}358}{160} = 57{,}246 \text{ MBM}$$

Final substitution in the formula:

$$AC = \frac{Vm - Vd}{R} + I$$

$$= \frac{6590 \text{ MM} - 4280 \text{ MM}}{160} + 57.2 \text{ MM}$$

$$= 14.4 + 57.2$$

$$= 71.6 \text{ MMBM}$$

Check of Iindicated Allowable Annual Harvest Cut of 71.6 MMBM.

Balance of the development period is 20 years. During this 20 years the average annual harvest cut will cover $\frac{71{,}600}{13.6}$ or 5,265 acres.

For 20 years this amounts to 20 (5,265) or 105,300 acres. The intermediate cut will cover the remaining virgin acreage and remove

about 10% of the virgin volume or 1.4 MBM per acre. This leaves a residual of 12.2 MBM per acre. Growth of 90 board feet per acre per year can be expected on virgin areas as soon as intermediate cut is made. $20 \left(\frac{90}{2}\right)$ or .9 MBM

It then follows that at the close of the balance of the development period the average volume per acre of the area where an intermediate cut has been made is

12.2 MBM + 0.9 MBM or 13.1 MBM

At the end of 20 years the harvest cut operations will be shifted to that area where intermediate cutting was done in virgin timber. Growth will continue at the rate of 90 board feet per acre per year on the residual areas while harvest cutting is in progress. Harvest will take 80 years (this is determined by "cut and try" since growth is taking place all the time on the residual portion). The average volume per acre at the time of cutting will be:

$\left(\frac{80}{2}\right)$ (90) = 3,600 bd. ft. + 13,100 bd. ft. = 16,700 bd. ft.

Years to cut $\frac{16,700\ (343,453)}{71.6}$ = 80 years.

During the 100 years (80 +20) required to cut over the virgin area the residual stands have been growing at the rate of 90 board feet per acre per year. When harvest cutting starts in residual stands, the average volume per acre will be:

(100) (90) + 8,300 = 17,300 bd. ft.

Growth will continue on the uncut portions while harvest cutting is under way. Harvest cutting will take 31 years. Average volume per

acre for residual stands during the time they are being cut amounts to:

$$\frac{(31)}{(2)} \quad 90 = 1{,}395 \text{ bd. ft.}$$

$$1{,}395 + 17{,}300 = 18{,}695 \text{ bd. ft.}$$

Time required to harvest cut:

$$\frac{(18{,}695)(117{,}380)}{71.6} = 31 \text{ years.}$$

To cut the virgin and residual stands has required 100 + 31 or 131 years. This leaves 29 years in the current rotation; however, cutting in young growth will not last that long.

$$(131 \text{ years})(128 \text{ bd. ft.}) = 16{,}768 \text{ bd. ft.}$$

$$\text{Present volume per acre} = \frac{1{,}300}{18{,}068}$$

Years to cut young growth:

$$\frac{(13{,}281)(18{,}068)}{71.6} = 3 \text{ years}$$

Comparison of years to cut with the rotation:

Rotation	160.0 years
Years to cut	
20 + 80 + 31 + 3	134.0 years
Discrepancy	- 26.0 years

Thus, the cut is high. A rough adjustment is made as follows:

$$\frac{71{,}600 \times 134}{160} = 60 \text{ MM bd. ft.}$$

This check and adjustment indicates an allowable cut of the same volume as that used in the prior method (where no growth was calculated on virgin stands until after cutting).

COMPARISON OF CALCULATION OF ALLOWABLE CUT BY KEMP FORMULA

As a further check on the allowable cut in the ponderosa pine type it is interesting to compare with a method developed by Paul Kemp of the Intermountain Experiment Station.

$$\text{Allowable cut} = \frac{(7\ Am + 5\ Ap + 3\ As + 1\ Ar)}{4\ R} \times Vm$$

Am = Area of mature and overmature timber

Ap = Area of pole-sized timber

As = Area of sapling-sized timber

Ar = Area of restocking and nonstocked

Vm = Per acre volume of stands in which cutting is scheduled.

R = Rotation age.

As explained in S, PLANS, R-1, Timber Management Planning letter of 2/27/56 the following is quoted:

> The formula needs only areas by size classes, the average per acre volumes of the stands to be cut, and rotation age. It is based primarily on a compromise between area and volume requirements.
>
> In effect, where mature and overmature stands now occur, this cutting formula permits cutting working circles at a rate faster than the sustained yield rate. The maximum rate that can be cut under this formula is 175% of the normal if all stands in a management unit (working circle, compartment, or timber type), are mature or overmature; in a management unit where no stands are of rotation age, no cutting would result, except, of course, improvement cuttings.

Application of the formula:

Am = 528,553 acres

Ap = 11,051 acres

As = 2,230 acres

Ar = None

Vm = 13,600 bd. ft. per acre

R = 160 years

$$AC = \frac{(7)(528,553) + 5\ (11,051) + 3\ (2,230) + 1\ (0)}{640} \times 13.6$$

$$AC = \frac{3,761,186}{640} \times 13.6 =$$

AC = 5,879 x 13.6 = 79,554 MBM.

This is the calculation of the total allowable annual cut and when compared to our first calculation of allowable cut, it indicates a slightly lower allowable annual cut, that of 80 MM bd. ft. as compared to 83.3 MM in our original calculations.

CALCULATION OF THE ALLOWABLE CUT FOR THE LODGEPOLE PINE TYPE

Basic stand data are as follows:

	Area in Acres	Total Volume		Per Acre	
		Bd.ft.	Cords	MBM	*Cords
Sawtimber	60,062	189 MM	590 M	3.1	9.6
Cutover	1,603	6 MM	19 M	3.7	11.7
Poles & Saplings	87,905	120 MM	771 M	1.4	6.6
Saplings	13,768	-	-	-	-
Total	163,338	315 MM	1380 M	-	-

*Cord volume is pole volume and sawtimber or all material in the stand from 5" DBH up.

Calculation of the allowable cut was made using Kemp's formula:

$$\text{Allowable cut} = \frac{(7\ Am + 5\ Ap + 3\ As + 1\ Ar)}{4\ R} \times Vm$$

$$= \frac{7\ (61,665) + 5\ (87,905) + 3\ (13,768) + 1\ (0)}{4\ (100)} \times 3.1$$

$$= 2,720,700 \times 3.1$$

$$= 8.4 \text{ MM bd. ft.}$$

In cords:

$$= 2,720,700 \times 9.6$$

$$= 26.1 \text{ M cords}$$

FOREST CONTROL RECORD FOR BUDGET PERIOD 1956 - 1960

Block	1956			1957			1958			1959			1960		
	Area	PP	Mixed Total	Area	PP	Mixed Total	Area	PP	Mixed Total	Area	PP	Mixed Total	Area	PP	Mixed Total
Mountain Home D-1															
Cottonwood D-2															
Idaho City D-3															
Atlanta D-4															
Lowman D-5															
Emmett D-6															
Garden Valley D-7															
Bear Valley D-8															
Cascade D-9															
Landmark D-10															
GRAND TOTAL															

UNIT AREA CONTROL - ITS DEVELOPMENT AND APPLICATION[1/]

William E. Hallin

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The development of unit area control was the culmination of a lifetime of work by Duncan Dunning. It is a silvicultural concept in which the essential characteristic is "detailed control of stocking on small areas." The basic idea is not new. In some localities it has been referred to as forestry by the acre.

"Unit area" and "control"-- the two parts of the term -- are the keys to understanding this concept. "Unit area" was selected because silviculture must fit stand conditions that are natural units. Most forests are composed of homogeneous stand units, or unit areas, varying in size from a fraction of an acre to many acres. Characteristics commonly determining the homogeneity of these unit areas are: age class, species composition, stocking, and presence or absence of seed trees.

"Control" was selected because it most aptly describes the aim of silvicultural treatments applied to the unit area. Control of the ground by a desirable or valuable tree species rather than by brush or inferior tree species is of first importance. Also, control means continuously maintaining adequate stocking of desirable species of trees that are growing at rates commensurate with the site. Silvicultural treatments applied at the proper time are the means by which the forester controls the stand.

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I wish to emphasize these two points: (1) Forest stands are made up of unit areas and (2) the forester controls his stand by applying silvicultural treatments.

Unit area control is in sharp contrast to the widely used forms of tree selection. Silviculture is applied according to the needs and conditions of each unit area of the stand rather than tree by tree according to generalized rules. An improvement cut by individual tree selection may, however, be appropriate for unit areas of young age class of some species before the final harvest cut.

Unit area control as a term was first used in connection with a cutting trial of sugar pine-white fir type; consequently many California foresters first thought the term referred merely to the technique used in sugar pine management. This is not the case; applying silviculture by unit areas is appropriate and desirable for other major types as well.

Large-scale trial and demonstration of these applications are under way in ponderosa pine at the Blacks Mountain Experimental Forest and in mixed conifer forests at the Stanislaus Experimental Forest. At both places small-scale studies are being carried on to implement and improve the application of unit area control.

Basis of Unit Area Control

Thirty years of research in the ponderosa pine and mixed conifer forests of the Sierra of California by Dunning and his associates have shown that previous methods of silviculture were not providing adequate restocking of pine. Analysis of records indicated a new approach was necessary. From this work, new

procedures that gave most promise of success were formulated by Duncan Dunning. These procedures are techniques for applying unit area control in the ponderosa pine and mixed conifer forests.

What the forester does in managing his stand is to analyze (1) the objectives of the land manager or owner, (2) the silvical characteristics of the species, and (3) the condition of the stand when treatment starts, in order to select and apply the appropriate treatment.

Objectives of Management

Obviously what the land manager wants is the first controlling factor in determining what is done to the forest. The land manager must decide the species desired, the acceptable degree of stocking, the size and kind of product desired, and make the customary managerial decisions.

Customarily in the ponderosa pine or mixed conifer types of primary objective of land managers is to grow large size ponderosa or sugar pine peeler logs or sawlogs. If sustained production with a growth rate commensurate with the site capacity is desired, conversion of the unmanaged stand to a regulated stand -- a forest with each age class through rotation or harvesting age, uniformly represented, and adequately stocked -- is an essential objective.

Silvical Characteristics

Some of the important silvical characteristics of ponderosa and sugar pine that affects its management are: (1) They are intolerant species and grow best in even-aged groups. (2) They germinate best on bare mineral soil. (3) If pine starts free

of competition, its initial growth is rapid and usually it is able to compete successfully with fir, brush, and other vegetation that may subsequently become established. (4) For best growth, thinnings and cleanings are usually necessary. (5) Pine seeds are the preferred food of numerous rodents commonly found in our forests. (6) Pine does not prune itself of branches naturally during practical rotation periods. As a result of characteristics (1) and (2), ponderosa and sugar pine do not readily establish themselves under brush and white fir. Where they have become established under brush or white fir, they do not develop properly unless released from this competition.

Site quality, through its effect on growth rates, has an important effect on acceptable stocking, length of rotations and final yield.

Condition of the Stand -- Condition Classes

Ponderosa and sugar pine stands when considered by large areas are all-aged; however, when the forest is examined closely the trees are seen to occur in even-aged groups, usually small in size and homogeneous in respect to stocking, species, etc. Dunning has called these groups condition classes.

The objects of a classification by condition classes are: (1) To subdivide the forest or working circle into natural units sufficiently small and homogeneous for practical, uniform treatments (harvest cutting, regeneration, stand improvement, etc.). (2) To determine (a) which unit areas have existing stands adequate to carry as growing stock and, if they do, whether or not they

should be subjected to an improvement out, and (b) which unit areas have stands that should be clear cut and the unit regenerated. (3) To provide the basis for the cutting plan, the cutting budgets, the allowable cut, and other steps in a working plan that is most likely to accomplish stand regulation in the conversion period.

The basis for a condition classification is the prevailing, naturally occurring group stand structure. Dominant trees are used as indicators in condition classification because they make up more than 80 percent of the stand in board foot volume, but require counting or considering only about 40 percent of the stand in numbers of trees. The criteria for recognizing and classifying condition classes are age, species, degree of stocking relative to the stand aimed for in regulation, and -- for unit areas needing regeneration -- the presence or absence of seed trees and the presence or absence of brush or other vegetation needing eradication.

The age classes we have commonly used for the overstory are: (1) Overmature -- 300 years plus -- Dunning's tree class 5 or Keen's tree class 4; (2) mature -- 150 to 300 years -- Dunning's tree class 3 and 4 or Keen's tree class 3; (3) immature -- 75 to 150 years -- Dunning's tree class 1, 2 and 6 or Keen's tree class 2. Age classes commonly used for the understory are: (1) Young -- 25 to 75 years -- usually poles 4 to 14 inches d.b.h.; (2) seedlings and saplings -- 0 to 25 years -- usually trees less than 4 inches d.b.h.

This age class breakdown has been adequate for deciding on the appropriate treatment. However, in preparing management plans and regulating the cut it has been found desirable to have a greater breakdown of age classes for those ages below rotation age.

The species classification of a unit area is based on the relative number of dominants. If the most desirable species makes up one-third or more of the dominants the unit area is designated as that species. If the most desired species makes up less than one-third of the dominants, the next most desirable species is considered; and so on down the list of species in their order of desirability. Although this species designation is for the purpose of classifying the unit area at the time of inventory or treatment, it commonly indicates the species to be favored on the particular unit area for the conversion period. With favorable conditions, however, the forester may treat some unit areas so as to change the species to more valuable ones. Although species consideration is not a problem on much of the ponderosa pine type, less desirable species occur and present a problem on some unit areas in most localities.

Stocking is rated as adequate or inadequate on the basis of a minimum stocking that is acceptable to the land manager. On our Blacks Mountain Experimental Forest in the ponderosa pine type we ordinarily use 25 percent stocking as the minimum. The minimum size unit that will be segregated must be decided upon by the land manager also. One-fifth acre is the minimum sized unit area on which we try to regenerate.

For practical operating reasons one-fifth acre may sometimes be too small. The question of what should be the minimum, optimum, and maximum sized unit areas has often been asked by foresters. Nature has already established the present sizes of unit areas. The forester, of course, can change the size of unit areas by silvicultural treatments. However, during the early stages of converting the wild forest to a managed one, he can make very few such changes. It is possible, for example, to cut and regenerate a small mature unit area at the same time an adjacent overmature unit area is out and regenerated, thus making one unit area of a more desirable size. In practice, however, the lack of adequate young components in the stand usually makes this undesirable. If unit areas are larger than desired they can be subdivided and the parts cut and regenerated at different times. In California pine stands, unit areas over 5 acres in size are not common, consequently we haven't given much thought to maximum size in our pine stands.

Seed trees are rated as adequate or inadequate for old or mature unit areas without adequate advance growth. Seed trees should be around the border of the unit area to be regenerated. The number and size required varies with the species.

Shrub or other vegetation requiring eradication is rated as present or absent on unit areas needing regeneration.

Recognition of condition classes is not unduly complicated when it is viewed in terms of these few criteria. For any specific unit area the following questions should be answered: (1)

What is the age class of the overstory? (2) What is the species composition? (3) For immature and mature age classes, is the stocking acceptable to carry as a reserve? (4) Is there an understory present? (5) What is the species composition of the understory? (6) Is the stocking of the understory adequate? (7) If the understory is inadequately stocked or absent are there adequate seed trees? (8) If the understory is inadequate or absent are shrubs or other competing vegetation needing eradication present or absent?

Treatments

In the application of unit area control each unit area of a specific condition class is given its appropriate cutting and all other necessary treatments at the proper time. I wish to emphasize the importance of applying all treatments. The immediate objective is to keep control of the ground with trees. As previously mentioned, the long-time objective is to convert the forest into a regulated stand with each class through rotation age uniformly represented as even-aged groups or unit areas with adequate stocking and proper growing conditions. This means even-aged management. The main intial treatments to be applied are as follows:

Cutting for natural restocking is carried on in unit areas of overmature condition classes with inadequate advance growth, with suitable seed trees present, and during a year of a good seed crop. These condition class units are clear-cut, but seed trees are left around the border of each unit. Rodents are controlled

with lethal bait. Slash and brush are piled and burned. Competing vegetation is eradicated, and the bare mineral soil exposed as a seedbed. If natural regeneration fails the unit area is planted at once before brush and other vegetation invade it.

Cutting for artificial restocking is carried out in the unit areas of overmature condition classes with inadequate advance growth, but with suitable seed trees absent or no seed crop in sight. These condition classes are clear-cut. Slash is piled and burned. Competing vegetation is eradicated. Because of the infrequency of good seed crops a high proportion of the overmature classes may need to be regenerated by artificial means.

Ultimately, of course, unit areas will be harvested and regenerated when they reach rotation age.

Timing is especially important in securing either natural or artificial reproduction. Once an area has been prepared for reproduction, it should be restocked at once, otherwise brush and other competing vegetation will invade and rapidly take control of the ground. Hence it is vital that planting stock be available when regeneration outs are planned, either for planting the entire area or for fill-in planting where natural reproduction fails.

Cutting for release is carried on in unit areas of overmature classes with adequate advance growth. The overstory is clear-cut to release young growth; cutting is followed up with pruning,

thinning, and other stand improvement measures.

Improvement cuts are made in young but merchantable stands (immature and mature age classes). The occasional old, malformed, or defective trees are removed to improve the condition of the stand. At this point, it is well to point out there is distinction between an intermediate harvest cutting and a final harvest cutting. Even though the final harvest cutting is in some form of clear-cutting any intermediate harvesting or improvement cutting must be some form of individual tree selection.

Risk Cutting

How does sanitation-salvage or risk cutting tie in to unit area control? Where risk trees can be readily recognized and the proportion of them is low, a risk cut the first time around is desirable. Under these conditions, by removing a low volume per acre the working circle or forest property can be rapidly cut over and the stand protected from serious insect loss. This should be followed by silvicultural treatments as indicated by the needs of the stand. In unit areas for which the final harvesting is deferred until later cutting cycles the risk trees should, of course, be removed when nearby unit areas are harvested.

In species and types where risk trees cannot be readily recognized or when the proportion of risk trees is high, the first cut should be based on the silvicultural objectives rather than salvage objectives.

Application of Unit Area Control

I will now briefly discuss some of the problems in the application of unit area control.

Inventories and Management Plans

Adequate inventories and preparation of suitable management plans are desirable and necessary with any method of cutting if a continuous forestry enterprise is the objective of the landowner. Unit area control can be started without inventories just as any type of cutting can. On any forest working circle the desired progress toward a regulated stand depends on an adequate inventory and management plan. The application of unit area control perhaps makes the need more obvious.

Adequate reserves for short cutting cycles are maintained by deferring the final harvesting on some unit areas. A knowledge of the area and volume for each condition class is necessary in order to make the best decision on the amount of reserve to carry and to decide which unit areas to harvest now and which ones later. These decisions can be made on the basis of a general knowledge of conditions for the working circle. However, in order to make adequate progress towards a regulated stand an adequate inventory cannot long be delayed.

The area and volume for each condition class can be estimated by customary sampling procedures. In the more open types, such as much of our ponderosa pine stands, aerial photos can be used for area determination and volumes determined from sample plots within the different condition classes. Areas can also be determined by the line transect method.

Calculating the allowable cut and preparing the cutting plan are simplified with an inventory by condition classes. The

deficiencies or excesses in the different age classes are readily shown. By using a combination of area and volume regulation the condition classes can be sorted out into their proper place in the cutting plan in order to provide for a sustained cut and progression toward a regulated stand. The younger age classes with or without an overstory are allocated to cutting cycles at the end of the rotation and the overmature age class to the first part of the rotation. The mature and immature age classes are fitted in between. With this type of a picture priorities of cut can readily be set up. Because condition classes are usually even-aged, conventional yield tables can be used for predicting growth.

Short cutting cycles are desirable in order to maintain proper control of the stand. In converting virgin old-growth stands to a regulated condition, the large volume of overmature trees appears to present somewhat of a problem if initial cutting cycles are to be kept short. This can be quite satisfactorily handled by deferring the final harvest on some of the overmature unit areas. The analysis of stand structure by condition classes will give the first indication of kinds of condition classes on which the final harvest should be deferred. If during certain periods for one reason or another planting is not feasible, cutting of overmature unit areas needing artificial regeneration can be deferred until such time as planting or seeding can be carried out.

Overmature condition classes vary in age from 300 to 600 or 700 years. Usually the decision on whether to cut or defer a

unit area will be based on its relative thriftiness. The older and more decadent unit areas will be cut now, and the more thrifty and less decadent ones cut in a later cutting cycle. The proportion of risk trees in a unit area also is a guide. Unit areas with a high percentage of risk trees should be cut rather than deferred. Risk trees, of course, are removed from the unit areas on which final harvest has been deferred.

On the Blacks Mountain Experimental Forest release of poles was given first priority after risk trees had been cut. As a result more than two-thirds of the pole stand had been released at the time of the inventory in 1949. Since then the overwood has been removed from most of the remaining unreleased pole stands. Consequently most of our present cuts in overmature unit areas are coming from unit areas with a seedling and sapling understory or from areas needing regeneration. Therefore, the condition of the overstory is the main controlling factor in selecting unit areas for cutting. In order to provide for a cut in each compartment in each 20-year cutting cycle we have set up 8M per acre as the desired reserve after our current cuttings. Although the reserve has fallen below this on some compartments because of a preponderance of very old condition classes, on most compartments we have had no difficulty in keeping a heavier reserve than this. The original volume averaged about 18M per acre, and all compartments now being cut have been cut over one or two times in the past.

Marking

The complexity of the forest prevents drawing up hard and fast cutting or marking rules that will cover all situations encountered in the forest. Consequently marking rules should be in the nature of guides only and emphasis should be on objectives. The marker should use his silvicultural knowledge and his ingenuity in order to best meet the objectives rather than slavishly following detailed rules.

During marking some kind of mapping is desirable in order to locate areas where subsequent work such as rodent control, site preparation, planting and so forth is to be done. A high degree of accuracy is not required as the main purpose of the map is to identify the areas so that they can be readily found later.

Regeneration

Regeneration quite often is the most critical problem facing the forester. If his efforts to secure prompt restocking fail, his forestry enterprise will, of course, ultimately fail. If artificial methods are necessary, regeneration can be one of the most costly phases of forestry. This is the most compelling reason to take advantage of means of securing natural regeneration whenever possible.

When seed years are infrequent, as they commonly are in ponderosa pine, some means of artificial regeneration are necessary. Insofar as is practical, the regeneration cuts should be made during years of a good seed crop. Unless there are units of the

working circle with a concentration of unit areas needing regeneration it is not practical to save up areas for regeneration cutting in seed years. Consequently the usual procedure would be to have a regular planned program for regeneration cutting and secure regeneration by natural means during seed years and by artificial means in other years.

I would like to again emphasize the importance of timing for natural reproduction; cutting, slash disposal and eradication of competing vegetation, and rodent control must be completed before seed fall.

Various types of so-called brush rakes or tractors have been quite successful in site preparation. In order to keep costs low highly skilled operators are essential.

Why not cut and then wait for a seed crop? In most areas brush and other vegetation would invade the area. The advantage of freshly releasing the ground for seedlings would be lost.

Logging

Basically logging is the same as with other types of cutting. However, a large part of the cutting consists of complete removal of the overwood to release poles, seedlings, and saplings. Consequently an adequate logging plan and careful supervision to prevent logging damage are essential.

One last caution in the application of unit area control. Most timber types are relatively uniform throughout their range. Within that range, however, there will be local differences in such things as local climate, subordinate vegetation, rodent

population, etc. A fundamental principle of unit area control is that treatments must fit stand needs or requirements. Therefore, you must consider your own stand conditions when adopting or adapting silvicultural treatments that are successful elsewhere.

Summary

1. Forest stands break down in small homogeneous stand units--unit areas.

2. The forester keeps desirable tree species in control of the ground by means of silvicultural treatment.

3. What the forester does in managing his stand depends on (a) objectives of the land manager, (b) silvical characteristics of the species, (c) condition of the stand when treatment starts and (d) treatments required to obtain the desired results -- all the treatments and at the proper time.

4. Intolerant species grow best in even-aged groups, consequently even-aged management is desired.

5. In stands predominantly overmature in character, adequate reserves for short cutting cycles are maintained by deferring the final harvesting of some overmature unit areas.

Stripped to essentials, unit area control is, with due consideration of the silvical characteristics of trees, the common sense application of silviculture to the individual unit areas of the forest stand.

Additional Information: Unit Area Control in California Forests
William E. Hallen, Forester
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California Forest and Range Experiment Station, Berkeley, California

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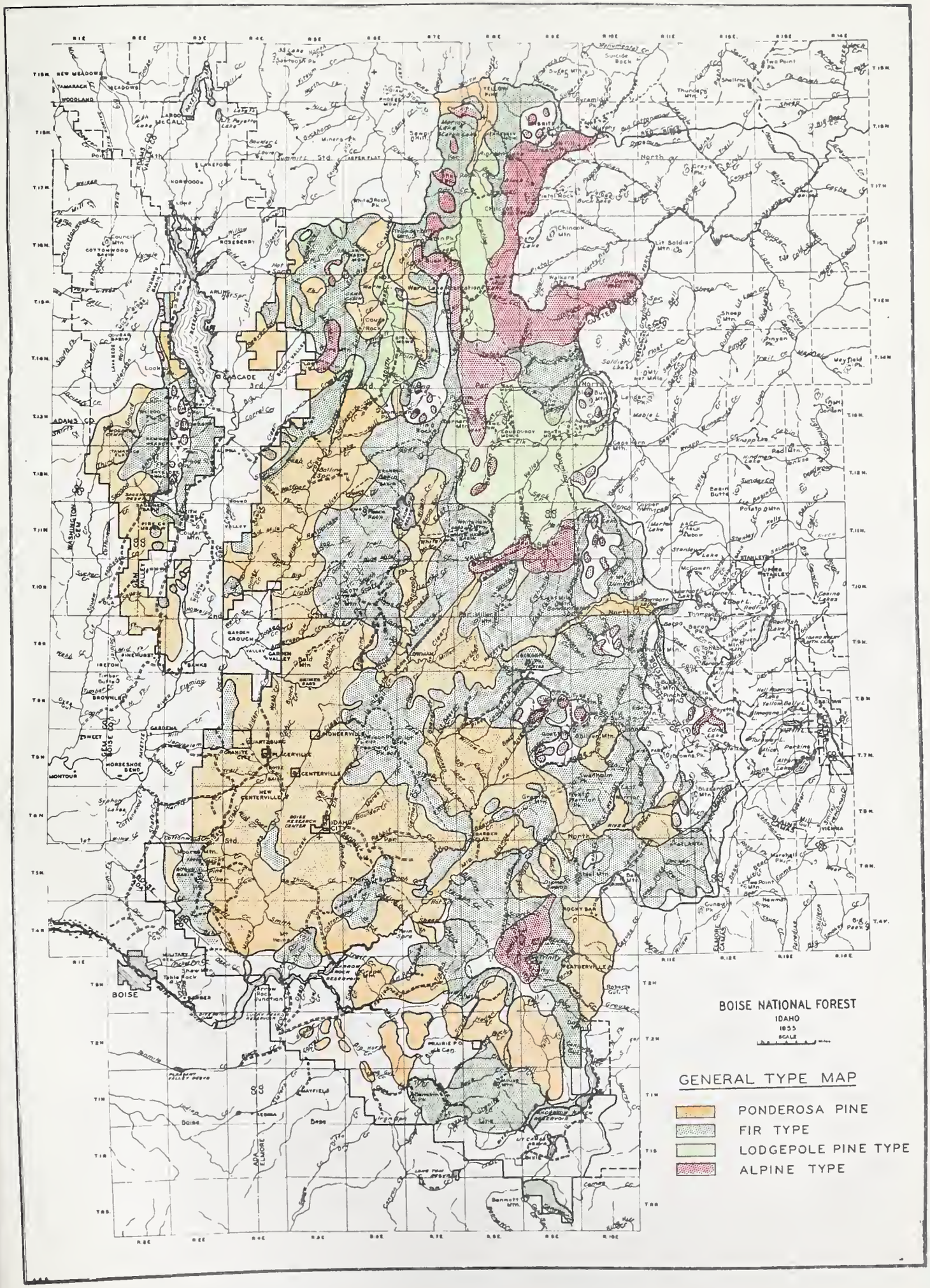
BOISE NATIONAL FOREST
IDAHO
1955
SCALE
GENERAL TYPE MAP
PONDEROSA PINE
FIR TYPE
LODGEPOLE PINE TYPE
ALPINE TYPE